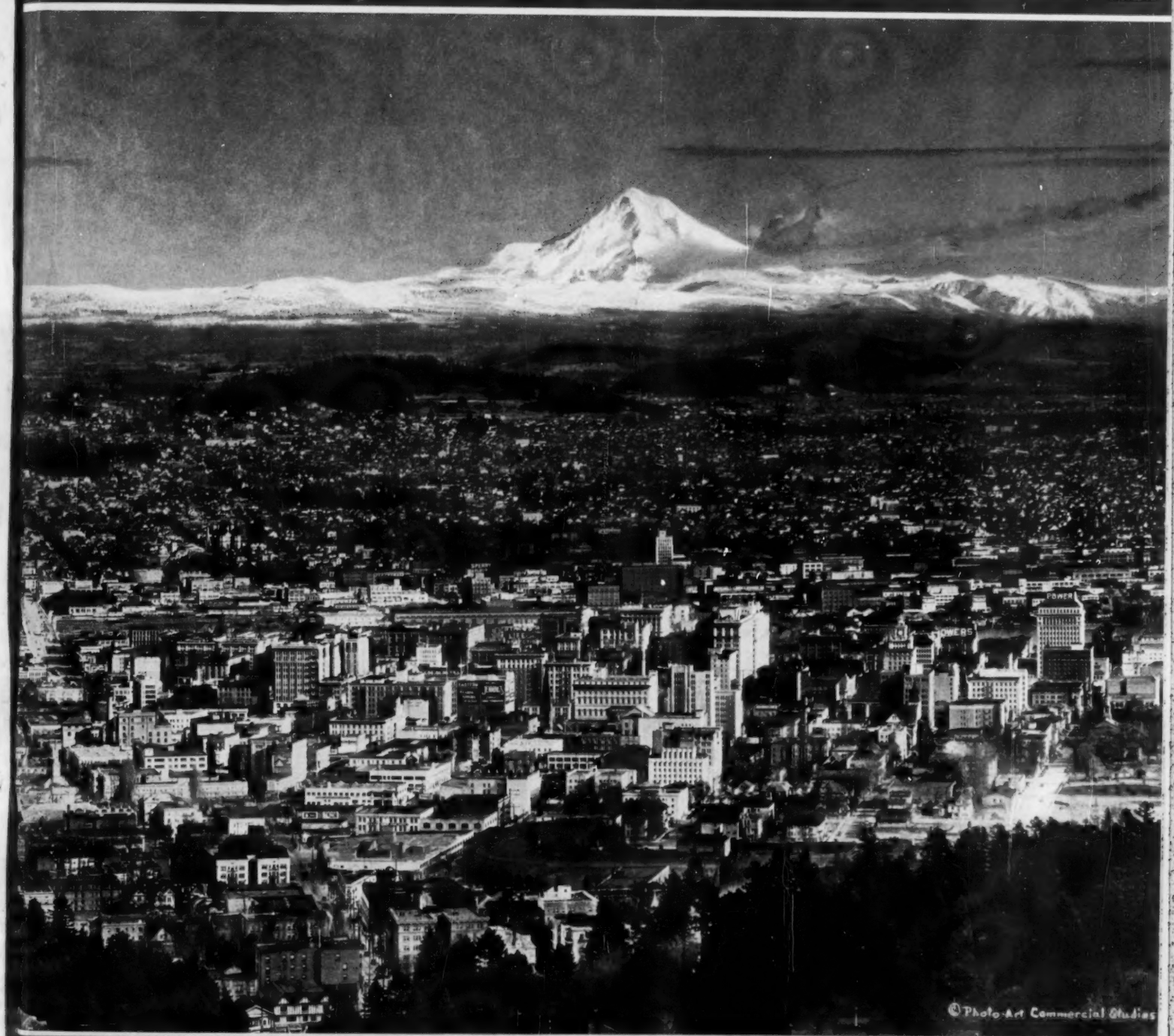
ELECTRICAL WEST

THE ALL-INDUSTRY MAGAZINE OF PROGRESS



Portland, host to Pacific Coast Convention, A.I.E.E., Aug. 9-12

McGraw-Hill Co. of California
Price 25 cents Per Copy

JULY 1938

You Get So Much At Such Small Cost
THIS NEW ELECTRIC 'AUTOMEAL' MEANS
LESS KITCHEN WORK
AT ALL DEALERS OR YOUR NEARBEST EDISON OFFICE
INTRODUCTORY SALE OFFER
'AUTOMEAL' COMPLETE with UTENSILS and STEEL TABLE
$2.95
VISIT THE AIR CONDITIONING SHOW
THIS ELECTRIC 'AUTOMEAL'
COOKS FOOD AUTOMATICALLY
NO MORE "POT-WATCHING" THIS AUTOMATIC WAY
INTRODUCTORY OFFER . . . STEEL TABLE GIVEN FREE
LOOK AT ALL THE THINGS YOU CAN DO WITH
THIS NEW ELECTRIC 'AUTOMEAL'
Cooks A Complete Meal For 8 or 10 People
A PRODUCT OF Westinghouse
NOW EVERY WOMAN CAN ENJOY THIS EASIER, BETTER, COOLER COOKING
SUMMER DAYS ARE HERE AGAIN
HERE'S COOL COOKING
WITH THE NEW ELECTRIC 'AUTOMEAL'
It will do all your cooking from soup to dessert
A COMPLETE COOKING UNIT . . . AT LOW COST
AT ALL DEALERS OR YOUR NEARBEST EDISON OFFICE
SALE OFFER
Widening the Appliance Market
SOUTHERN CALIFORNIA EDISON COMPANY LTD.

Big space advertising is helping to make the electric roaster one of the fastest selling appliances in Edison territory. Coming at the start of the summer season, this promotion effort is timed to boost appliance sales when they need it most. Dealers who display and demonstrate electric roasters this summer will find a gratifying source of new profit at a very low selling cost.

ELECTRICAL WEST (with which is consolidated The Journal of Electricity), July, 1938, Vol. 81, No. 1. Published monthly by the McGraw-Hill Company of California, 883 Mission St., San Francisco, Calif. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. Additional entry as second class matter at the post office at Los Angeles. Printed in U. S. A. Subscription rate in U. S. and U. S. possessions, and Canada, $2 per year; all other countries $3 gold (thirteen shillings). Single copy 25c.
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The All-Industry Magazine of Progress

ELECTRICAL WEST

MEMBER AUDIT BUREAU OF CIRCULATIONS

ESTABLISHED 1887 AND INCORPORATING THE "ELECTRICAL JOURNAL," "JOURNAL OF ELECTRICITY, POWER & GAS" AND "JOURNAL OF ELECTRICITY"

ABP

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CONTENTS FOR JULY, 1938—VOL. 81, NO. 1

Electra's Husband 13

Favorable Public Contacts.....R. E. Fisher 14

Engineering

First High-Voltage Oil Cable.....J. A. Koontz 16
Treating Plant Cuts Cost in Wood Preserving..... 18
A. I. E. E. Portland Convention..... 19
Water Heaters and Distribution.....Eugene Vinet 20
Two-Way Radios .....A. O. Mangold 22

Sales Parade 23

Appliance Sales Guide—Electric Kitchens..... 25

Lighting & Wiring

Electrical Race Track..... 34
Gas, Darkness Checked by Electricity..... 36

Associations 39

Rural Loadbuilding 40

Editorial 42

News of the Industry 44

Where to Buy in the West..... 58

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More Money

THE man who makes money is the man with ideas. Business conditions mean nothing to him: good or bad, he's always looking for an idea which will mean an extra dollar. Nor does the source of the ideas mean anything: unless he's a rare, and bigoted, genius he never refuses help from an outside source. Ideas are all that count.

Right now ideas count plenty. . . . People say business is bad. That may or may not be. Business is bad only if you believe it is. Business can't be bad if the ideas are flowing.

The source of this flow is one of ELECTRICAL WEST'S features. True, it's set in 8-point type whereas the rest of the book is in 10-point. But that's no indication of the feature's merit. . . . That feature is a part of ELECTRICAL WEST because we know that it contains ideas which will help you get more business, make more money, effect greater economies, insure your position as a business leader in your community. That feature is called "Product Data."

A peculiar title. We might have said Product Literature or Product Bulletins or Manufacturers' Helps. We didn't simply because Product Data was the only title which would fit in one line and show our meaning.

Product Data lists all the most valuable pamphlets and booklets published by manufacturers of electrical equipment. These bulletins abound in ideas for you. That's why we run a list of them every month—in the simplest form possible.

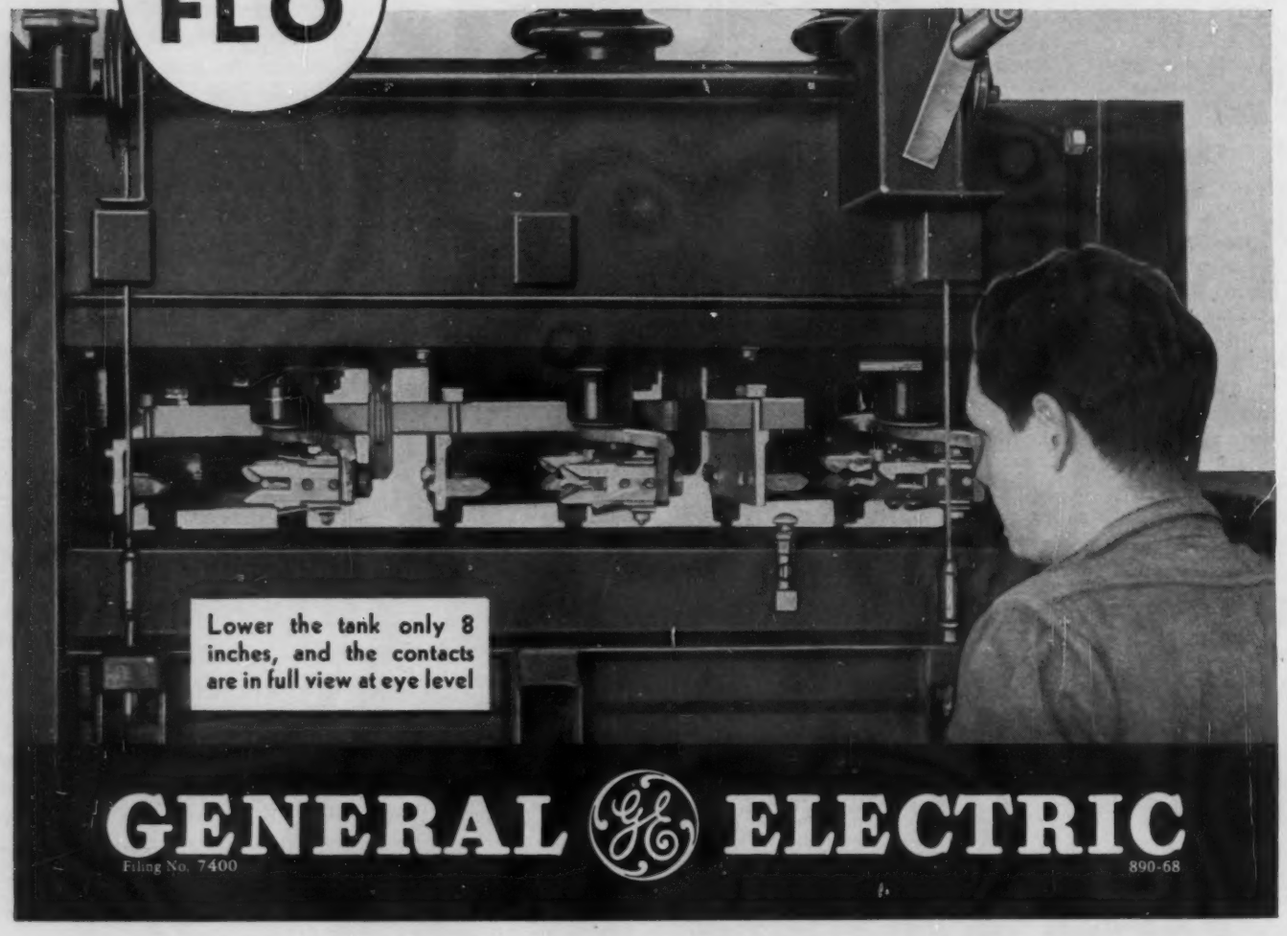
We could have used a fancy form. We could have printed coupons, enclosed stamped addressed postcards, etc. Instead we carry merely a numbered listing—with a couple of lines of description—of a dozen or so booklets. We do this because we know that you are not coupon clippers or catalog collectors. If a booklet listed is of value to you, you are willing to take one minute to mail ELECTRICAL WEST a postcard, "Send me Product Data item No. 1301."

Those postcards will mean more to you than the minute spent on them. They will get our prompt attention. They will bring you an instructive manufacturer's bulletin—or bulletins—capable of helping you make more money.

Why You'll Like This Popular NEW Breaker

TYPE FLO breakers have been a hit from the start. The oil-blast horizontal-break construction, an exclusive new feature, means a reduction of 50 per cent in parts. The mechanism is a new conception of simplicity. It's unique—direct acting—ideal from the standpoint of reliability. Unusual accessibility of contacts means an easy inspection job that every user appreciates. General Electric, Schenectady, N. Y.

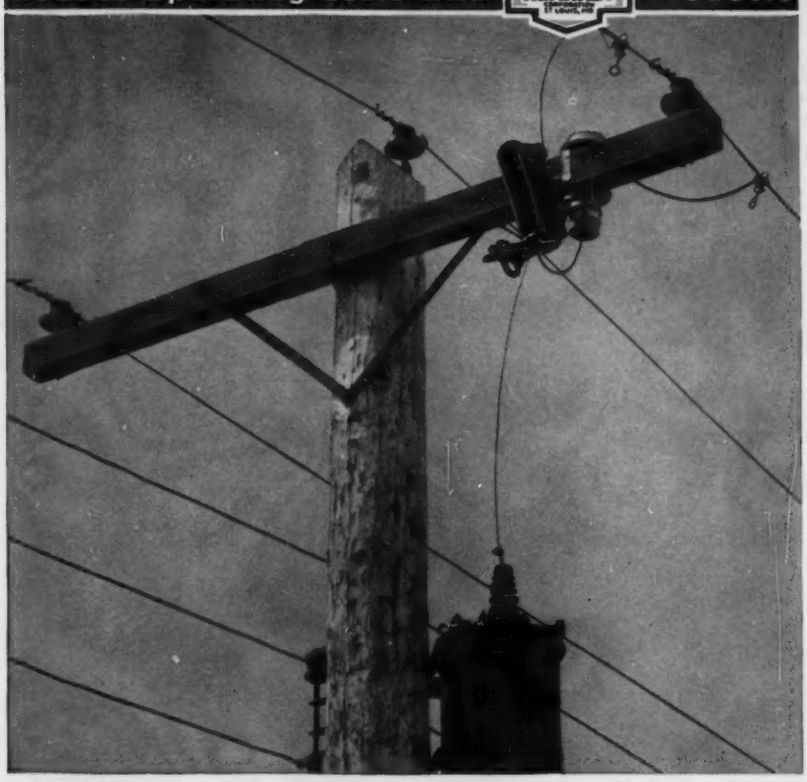
TYPE FLO



GENERAL ELECTRIC

Filing No. 7400 890-68

Reduce Operating Costs with JAMES R. KEARNEY Products



"See that open door on that Kearney Tripomatic? That's a trouble signal — tells there's been an outage."

Buy Guaranteed Contacts On Your Closed Cutouts

Accurate within 10% of current values — usually within 5% . . . Good reason why so many operating men insist on using Kearney Quik-Action Fitall Fuse Links to assure better switch performance.

Kearney Tripomatics Are Equipped With Guaranteed Point Pressure Contacts

EACH TIME you reclose a Kearney Tripomatic, after it has cleared a fault and protected your equipment, you wipe back a clean, bright contact surface . . . Point pressure contacts make this possible — no chance for corrosion, excessive heating, poor conductivity or other such difficulties which might prevent proper and dependable operation of the cutout and cause costly trouble.

Of course, there are other important design features in Kearney Tripomatics — positive trip-out action of the door, sturdy porcelain housing, non-corrosive metal parts and other refinements that have given this cutout its reputation for long-lasting service . . . But inspect it yourself for superior construction features . . . Then test it out to determine its true performance records. Specify Kearney Tripomatics on your next order and see for yourself why more and more operating men are standardizing on these cutouts that have point pressure contacts guaranteed to last the life of the cutout.

MANUFACTURED BY
JAMES R. KEARNEY CORPORATION
4224-42 CLAYTON AVE. SAINT LOUIS, MO.

Exclusive Sales Representatives

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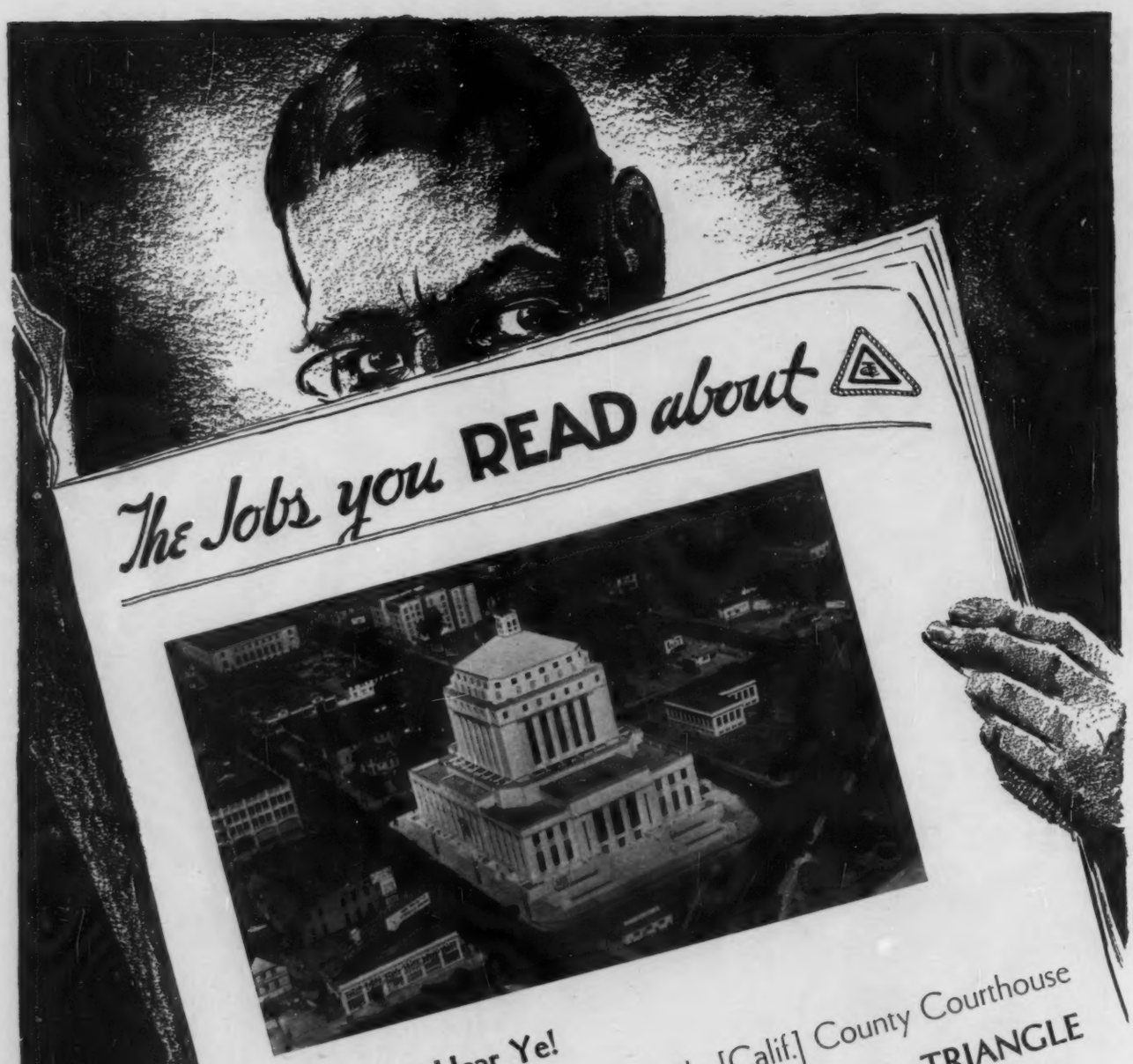


The Jobs you READ about

Hear Ye! Hear Ye!

Again—at the Alameda [Calif.] County Courthouse

The Contractor's VERDICT: "It must be TRIANGLE CONDUIT."

TRIANGLE PRODUCTS REWARD BUYERS!

TRIANGLE CONDUIT & CABLE CO., Inc.
Horace Harding & Queens Blvds.
ELMHURST, NEW YORK CITY, N.Y.

PACIFIC COAST DIVISION
C. C. Hillis, Vice-President in Charge of Sales
390 Seventh St., San Francisco, California

NEXT ISSUE
The BIG Parade

ARTERIES FOR ELECTRICAL INCORPORATED SYSTEMS

It MUST be right!

RECOVERED—$4,000 LOST REVENUE

Service Greatly Improved

Improved service—increased revenue. One of four G-E single-phase, branch-feeder step voltage regulators installed on rural circuits of Yamhill Electric Company, Newburg, Ore.

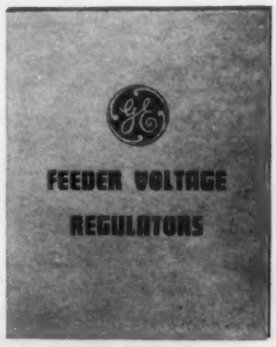
The experience of one power company after installing G-E Voltage Regulators

WHEN increasing loads brought poor voltage conditions on four of its rural circuits, the Yamhill Electric Company of Newburg, Ore., met the situation by installing four G-E branch-feeder step voltage regulators, at an installed cost of $1,000 each.

As a result, annual revenue from these circuits jumped from $40,000 to $44,000. Approximately half of this difference resulted from improved voltage; the remainder from new load made possible by the additional capacity of the lines.

In addition, customers of this utility are enjoying vastly improved service since the installation of the regulators.

You may have circuits on your systems that offer similar opportunities for applications of G-E regulators at a profit to both your customers and yourself. The complete G-E line of regulating equipment makes it possible to regulate for all areas and all load densities in the most economical manner. Ask your G-E representative for complete information, or write for our Catalog GEA-2762 on "Feeder Voltage Regulators." Address Dept. 6—201, General Electric Company, Schenectady, New York.



"Investment Fully Justified,"
says Vice President and Manager

Speaking of the performance of the four G-E regulators installed in 1936, Mr. A. L. Strickland, Vice President and Manager of the Yamhill Electric Company, says: "Our experience with these regulators has been very satisfactory, and—particularly on our class of long rural lines—we find this equipment maintains a satisfactory standard of voltage regulation. Its performance fully justifies our investment."

GENERAL ELECTRIC

Filing No. 5400

350-138

We serve

the whole community

THE hustling center of business downtown... busy factories along the railroad ... cozy homes on the outskirts ... *the whole community* ... is served by Graybar's distribution of electrical supplies.

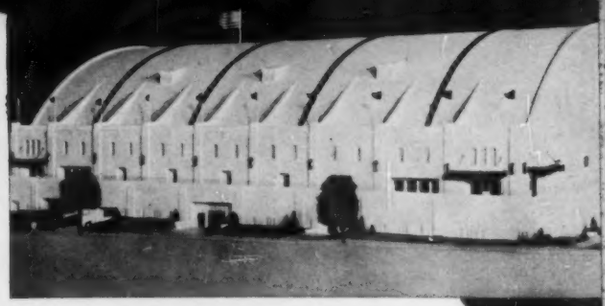
Pole lines to carry electric light and power over the countryside ... street lights and Public Safety equipment for the city ... motors for industry ... appliances for the home ... and wiring materials for every building or maintenance need ... all these are made readily available from Graybar.

Graybar's list of 60,000 electrical items amply meets *every* electrical need. Graybar's system of nearby warehouses brings you *what* you want ... *where* you want it ... *when* you want it. And Graybar's reputation since 1869 is your assurance of reliability.

GraybaR

OFFICES IN 85 PRINCIPAL CITIES . . . EXECUTIVE OFFICES: GRAYBAR BLDG., NEW YORK

Youngstown Conduit



SELECTED FOR SAFETY OF HUGE HERSHEY ARENA

The Hershey Sports Arena -- the largest span monolithic concrete structure in America -- is unusual in many respects but entirely regular in one. Its electrical circuits are encased in Youngstown Buckeye Hot Dipped Galvanized Conduit. The scheduled amusement of thousands of spectators is not left to chance when electrical systems are safeguarded by this well known rigid steel electrical conduit.

Buckeye Conduit is preferred by owners, contractors and architects. The ductile lacquer lining provides a smooth raceway through which wires can be easily fished. Scientific control of analysis and operations in the mill produces a steel that has a perfect combination of strength and ductility which keeps the flats out of the bends and eliminates pinched cables. Heavy galvanizing assures ample protection for the toughest temperature and moisture conditions.

Buy Buckeye Conduit for speed of installation and for permanent satisfaction to the owner. You make more money and you have the satisfaction of a job well done.

★

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon and Alloy Steels

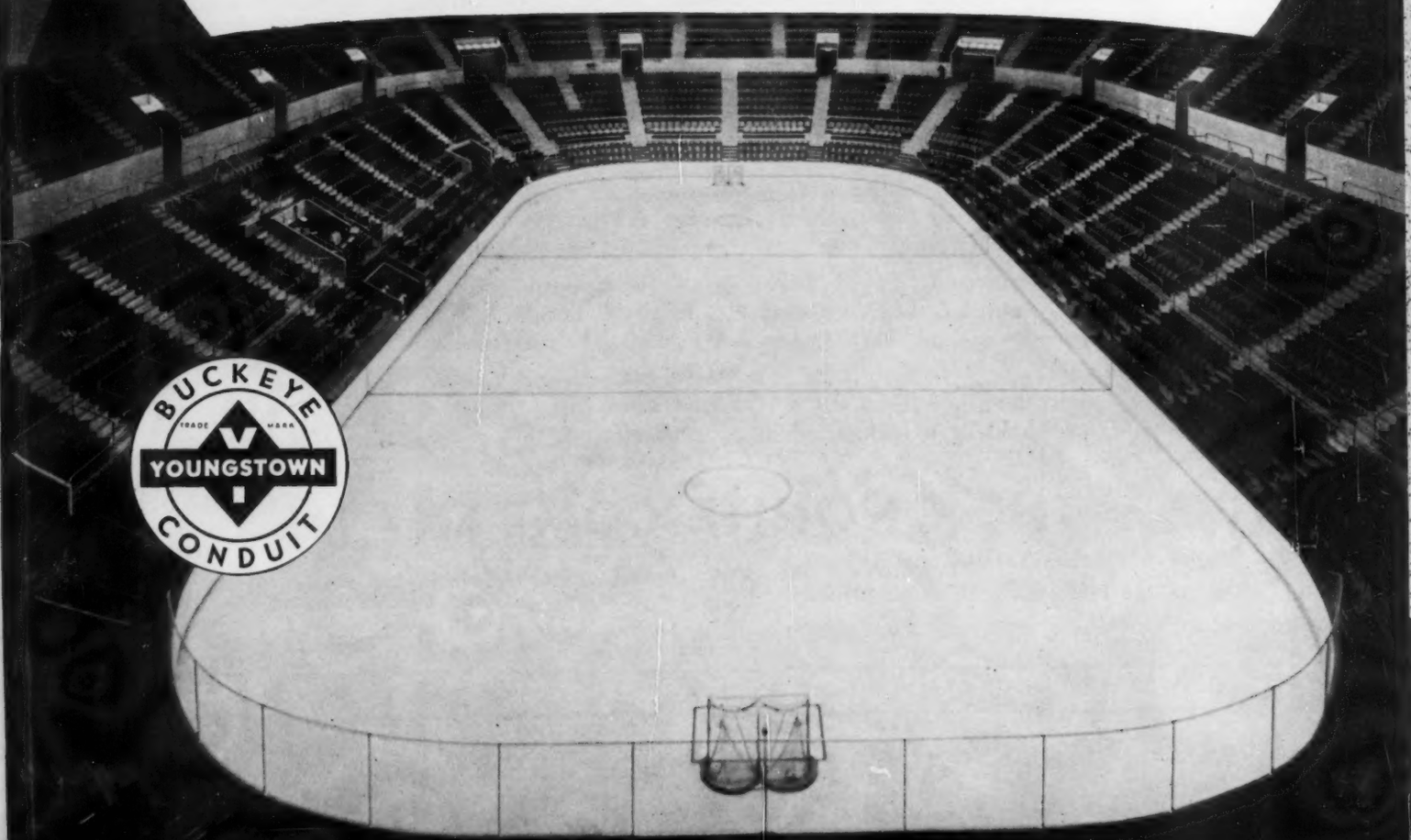
General Offices - - YOUNGSTOWN, OHIO

26-5A

★

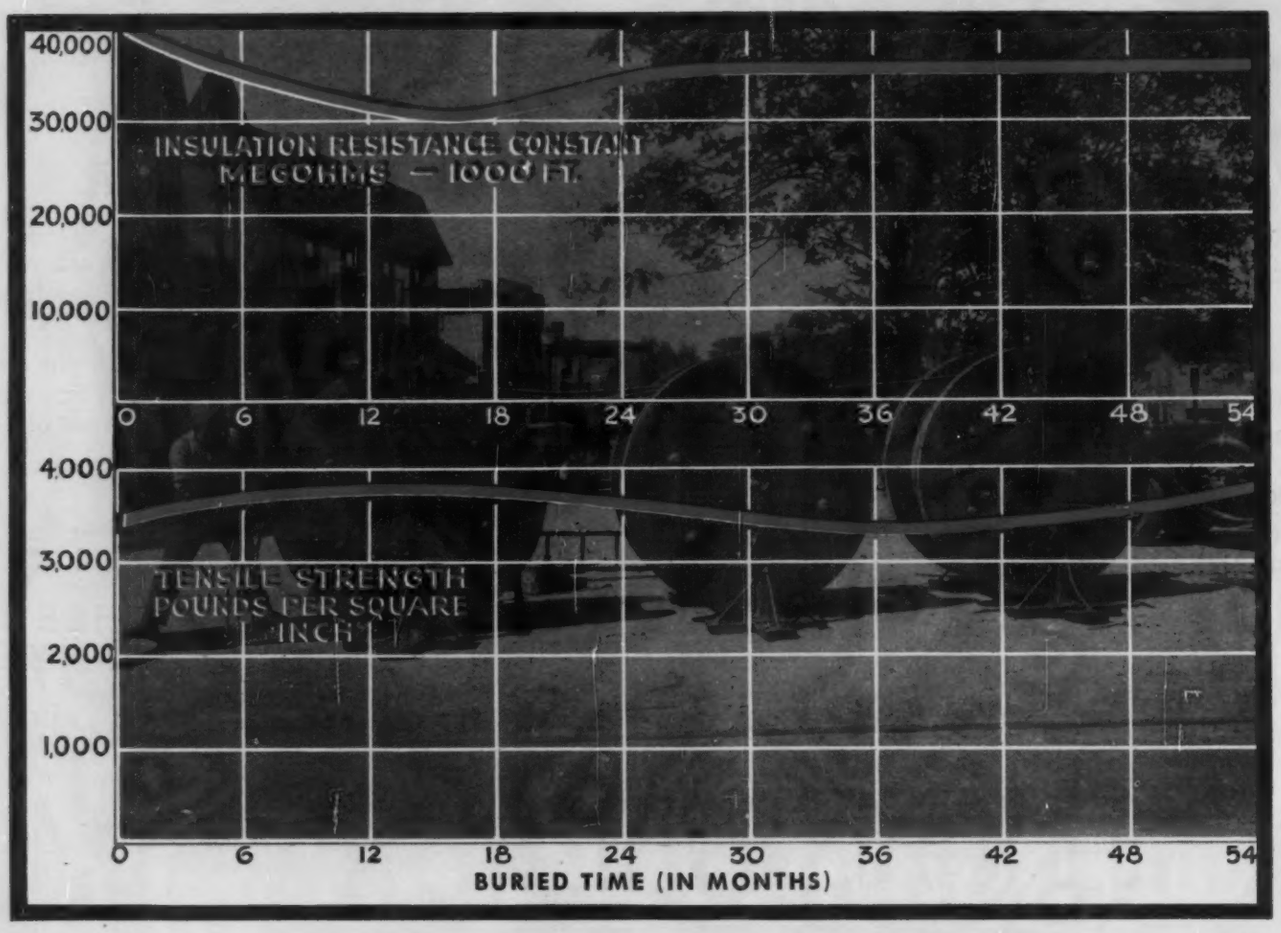
YOUNGSTOWN

Sheets - Plates - Pipe and Tubular Products
Conduit - Tin Plate - Bars - Rods - Wire - Nails
Unions - Tie Plates and Spikes



OKOSHEATH

A NON-METALLIC SHEATHED CABLE



The excellent moisture resistance of Okosheath cable is shown by the above curves. These show the results obtained on a length of standard, single conductor No. 4/0 A. W. G., 600 volt Okosheath cable which has been buried in *wet ground* for five years. It was removed periodically and tested after twelve hours' immersion in water.

Mark the extreme simplicity of Okosheath cable. Just a tough rubber belt around the conductor. That is Okosheath. Simple in design—but it *lasts*.

There is nothing to deteriorate and rot away. Enormous quantities of Okosheath, used both in conduit and buried directly in the ground, have demonstarted its durability.

Okosheath is effectually moisture resistant. It is clean, smooth, flexible, light in weight, small in diameter; easy to handle and install. A lineman can splice it. Strong and compact, Okosheath is just the cable for the tough pulls.

Okosheath opens the way for the new trends and demands. Besides lower first cost, it saves in maintenance. The dollar benefits are *both* ways.

Note: The above chart appears in our latest booklet on Okosheath, which will be mailed upon request.

1938 Marks Our 60th Year of Service

THE OKONITE COMPANY

Founded 1878

EXECUTIVE OFFICE: PASSAIC, NEW JERSEY

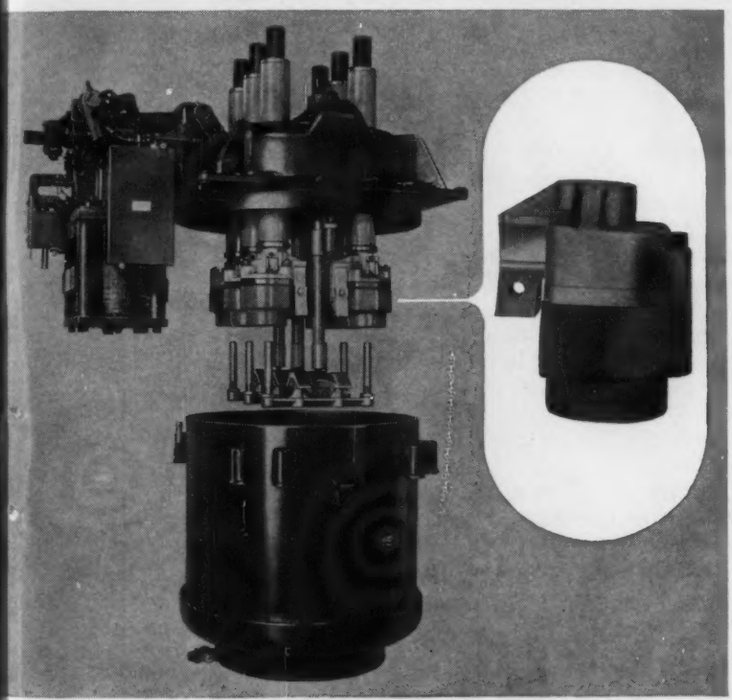
HAZARD INSULATED WIRE WORKS DIVISION — THE OKONITE-CALLENDER CABLE CO., INC.

New York Boston Seattle Buffalo Chicago Dallas Detroit Atlanta
Philadelphia Los Angeles Pittsburgh St. Louis Washington San Francisco

OKONITE QUALITY CANNOT BE WRITTEN INTO A SPECIFICATION

QUICK-QUENCH!

Ruptors Extinguish Arcs FAST! Their "QUICK-QUENCH" Action CUTS Oil Carbonization and Contact Deterioration to a Minimum!



CHOSEN FROM TWENTY-THREE separate and distinct designs for an interrupting device was the "Ruptor," shown here at the right. After exhaustive tests, it was developed to its present high efficiency and incorporated in oil circuit breakers, such as the one shown here.

● High interrupting capacity! Low maintenance cost! Fewer contact replacements! More hours of service between inspections!

That's what you get with Allis-Chalmers Oil Circuit Breakers with Ruptors for high voltages. For Ruptors extinguish arcs . . . *in a hurry*! Their "QUICK-QUENCH" action reduces oil carbonization and contact replacement . . . eliminates high maintenance and inspection costs! You get consistent operation without constant attention.

Ruptors assure low tank pressures. They eliminate oil throw. Arc energy is kept low because interrupting arcs are exposed only to a small volume of oil. And when the circuit breaker does need service, the job is done quickly and easily. Ruptors are accessible to inspection and maintenance . . . easy to get at . . . not like other circuit breakers that take valuable time to service.

World-Wide Research Facilities

You get more "breaks" for your money when you specify Allis-Chalmers. And you get more than that. You get the benefits of Allis-Chalmers' engineering background and experience . . . the world-wide facilities that the testing laboratories of Allis-Chalmers, and of associated companies, can offer.

Find out what "QUICK-QUENCH" action can mean to you. Call the nearest Allis-Chalmers District Office. Let your Allis-Chalmers representative show you what "QUICK-QUENCHING" can do to give you higher interrupting capacities . . . at greatly reduced maintenance costs!

SWITCHGEAR DIVISION

ALLIS-CHALMERS

MILWAUKEE · WISCONSIN

METALCLAD SWITCHGEAR • SWITCHBOARDS • OIL CIRCUIT BREAKERS • REGULATORS • MOTOR STARTERS • CUBICLES • SWITCH HOUSES

"HOW MUCH?" *or* "HOW MUCH FOR MY MONEY?"

Are questions best answered by—

PORCELAIN

KNOBS • TUBES • CLEATS
OUTLET and SWITCH BOXES
Many Other Insulating Items

Whether it's a matter of *price* or *value*, Porcelain Insulation is your best business builder and today, more than ever before, closing wiring contracts hinges on one or both of these factors.

PRICE—To prospects primarily interested in the low cost of installation, knob and tube wiring enables you to quote minimum figures on whatever layout is desired. This means your customer gets *all* he wants . . . and *you* don't lose a thing by it, because knobs and tubes allow the contractor a larger margin of profit on every job.

VALUE—From this standpoint, featuring Porcelain Insulation is the best way to increase your share of the existing wiring business. For the same amount of money another contractor might quote for any other type of installation, knobs and tubes will enable you to add extra outlets or offer a more complete and flexible layout without cutting into your usual profit.

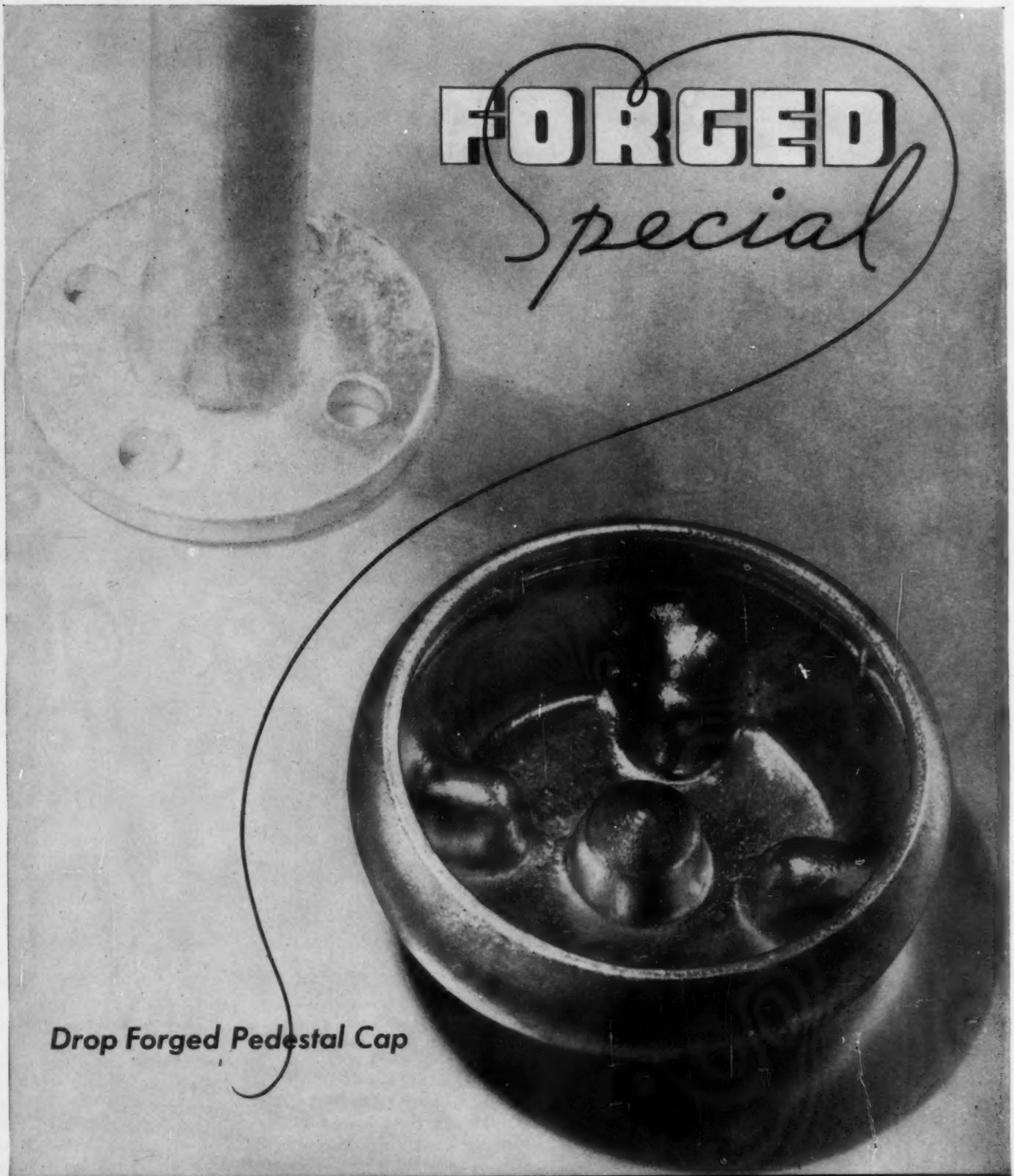
In addition, Porcelain Insulated Wiring is acknowledged to be the finest, safest kind of a job . . . Porcelain Insulated Wiring gives the permanent, trouble-free kind of service that increases customer satisfaction and guarantees for *you* first consideration on your customer's future requirements.

On every call you make . . . talk and sell Porcelain Insulated Wiring! Send for the Fact Manual—an instruction booklet on wiring which can be used in interviews with architects, home builders and home owners.

STANDARD ELECTRICAL PORCELAIN MANUFACTURERS

201 N. WELLS ST., CHICAGO, ILL.

CERAMIC SPECIALTIES COMPANY, East Liverpool, Ohio
ILLINOIS ELECTRIC PORCELAIN CO. Macomb, Illinois
KNOX PORCELAIN CORPORATION, Knoxville, Tennessee
PORCELAIN PRODUCTS, INC., Findlay, Ohio; Parkersburg, W. Va.
SPECIALTY PORCELAIN WORKS, East Liverpool, Ohio
SUPERIOR PORCELAIN CO., Parkersburg, West Virginia
UNIVERSAL CLAY PRODUCTS CO., Sandusky, Ohio



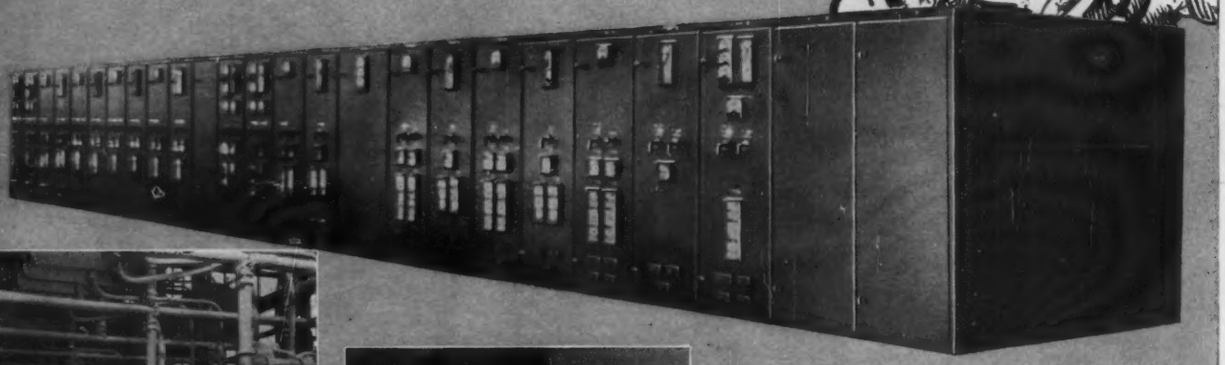
FORGED by B.T.C.

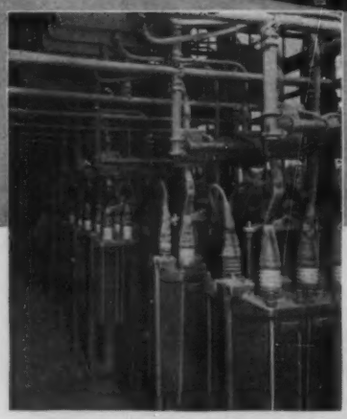
THROUGH YOUR INSULATOR MANUFACTURER ONLY

IF IT'S HI-LINE HARDWARE, B. T. C. CAN FORGE IT

THE BREWER-TITCHENER CORPORATION, CORTLAND, NEW YORK

YOU'RE LOOKING AT THE *SAFEST* SWITCHGEAR EVER BUILT

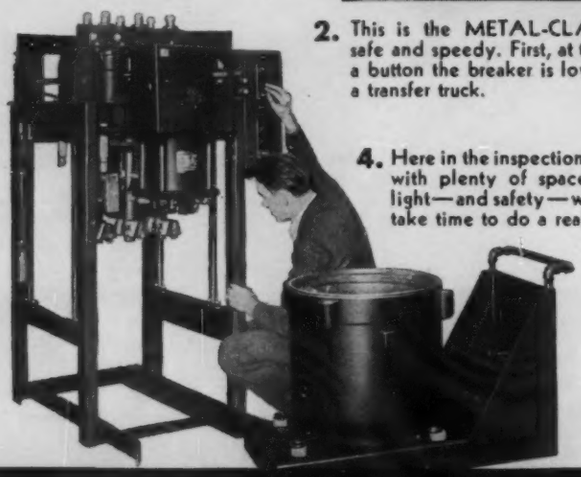




1. In the old days we had to work in among these breakers. Imagine doing a good inspection job, with safety!

2. This is the METAL-CLAD way—safe and speedy. First, at the press of a button the breaker is lowered onto a transfer truck.

3. Out she rolls and in goes a spare breaker. Then push another button and—service is restored in a few seconds.



4. Here in the inspection rack, with plenty of space and light—and safety—we can take time to do a real job.

And the production man says: Give me METAL-CLAD for increased production—lower costs. The easily removable breakers mean thorough, safe, convenient inspection without production delays.

For complete details on G-E metal-clad switchgear write for publication GEA-2499, large metal-clad, up to 15 kv, or GEA-2249, small metal-clad, up to 5 kv. General Electric, Schenectady, N. Y.

GENERAL ELECTRIC

880-32

ELECTRA'S HUSBAND

Wings over the Power Systems

EVERY once in awhile a friend in England who was over here with the touring World Power Conference delegates sends us a copy of a British electrical magazine. Electra even reads them because she enjoys the advertisements of "cookers" (ranges) and "fires" (heaters). Of late some of the advertisements have caused us to pause and consider how fortunate we are.

In a recent issue there were several ads headed "Air Raid Precautions" in which the manufacturers of "accumulators" (storage batteries) and engine-driven generating sets discussed national emergency precautions. Then there have been editorials on the subject of equipping power stations with bomb proof roofs and placing important substations underground, as well as directions for power house personnel in the use of gas masks and gas-proof clothing in case of air raids. Right at that time the newspapers were full of reports of the bombing of Canton and the destruction of the power plant serving that Chinese city. As I wondered what would happen in one of our West Coast cities in case of an air attack, I was mindful of a recent experience reported by a member of the industry.

Not many weeks ago he was one of a small group of civilians invited to witness some tests at one of our Pacific Coast army posts. He went into a room where stars adorned the shoulders of almost every officer present. On the wall was a huge map embracing parts of three states. It was studded with tiny electric globes. The names seemed familiar. They were not cities and towns, but power houses and attended substations. Across the top were rows of colored lights—one labeled "bombers," the other "pursuit."

Shortly a hush fell over the group. A light in the upper left hand corner of the map began to glow dimly, increased in intensity and then faded. In a few moments another light lower down did the same. Then, one by one, the lights under the heading bombers began to gleam—one, two, three, until there were nine. In a moment they went out, but along the coast line on the map, one after another, lights shone faintly, then brilliantly and finally blacked out.

Suddenly there was a series of sharp exclamations. A light along the mountain range at the right of the map had begun to gleam. As it faded six of the lights under "pursuit" flashed on. These had not proceeded more than two lights down the board when the top light glowed again. This time twelve of the lamps under "bombers" were illuminated.

The picture was clear. A squadron of nine bombers was flying down the coast. Hundreds of miles to the east six pursuit ships were scouting ahead of another flight of twelve bombers. The courses they were taking were as clear as if the observer had been flying parallel to them. Each flight was followed to its landing field. At one point it was obvious from the action of the lights that the coast squadron turned out to sea for 50 miles and then came inland.

The explanation? Simple. Communication systems of interconnected utilities were tied into a central point and linked to the huge wall map. Attendants in generating plants, substations and other points on the utility systems acted as observers (o. p.'s the army calls them). This great network of wires covered the whole territory shown on the map. Thus it was easy to trace the flight of the plane squadrons, transmitting the signals that actuated the lights. How did they distinguish between the types of planes? By the different sound of the motors on bombers and pursuit ships.

Incidentally, at all times the communication systems were available for the transaction of the normal business of the companies.

ONE could easily imagine a similar room in time of war—officers with headphones at desks facing the wall map, smaller maps before them. Orderlies ready to go with messages. Suddenly the map lights up—a flight of bombers and pursuit ships crossing our southern border. Action starts. Messages are dispatched to nearby airports directing defending air fleets to intercept the attackers. Word is flashed to motorized anti-aircraft batteries to be ready. Communication is maintained to all by radio. As the enemy craft head for their goal, defending forces are mobilized. Each move of the plane squadron is marked on the map. The course is changed. Messages are scribbled and an orderly dashes to an enclosed booth where a radio operator warns the defense planes of the new course. Another redirects the ground forces.

I would like to be the operator at a remote substation who might observe the ensuing dog fight. I think I would be outside watching the flight of enemy ships—bombers in squadrons of three with flanking and leading pursuit ships guarding their flight. Our own planes would try to fly higher, off in the direction of the sun. Suddenly there would be a long low whine from a diving plane, followed in quick succession by others. The enemy ships would break away into units and all hell would pop. What a sight!

THE plan of observation grew out of an experience a year ago when attendants of utility plants acted as observers during the "defense" of a mythical city laid out on the desert. They were able to warn the "blue" defending forces of the approach of "red" enemy air squadrons in time to ward off the "attack" successfully.

Even Electra thrilled as I told her the story.

"I read where European countries have spent millions in providing a system of warning against air attacks," she said. "And they haven't been successful. And here the power companies do it as a simple routine matter."

Favorable Public Contacts—One Way of Making Them

By R. E. FISHER
Vice-president in Charge of Public Relations and Sales, Pacific Gas and Electric Co.

IN THIS day of an inquisitive and impatient public any successful concern that wants to stay in business must guide its public contacts carefully so that each is a favorable one for the company. This is particularly true of the utilities, but it applies as well to any strictly merchandising business. Mass thinking can change as quickly as the direction of a summer breeze—friendly today, antagonistic tomorrow. This means that all business, and especially the utilities, must be striving constantly to keep abreast of changing public opinion, grasping every opportunity to influence public thought favorably and improving its methods of dealing with the public so as to attain a stronger bond of friendship and understanding.

Utilities are in a particularly good position to capitalize upon public contacts because of the great number of contacts made daily with their customers. Each of these, of whatever nature, registers positively or negatively. The first contact is especially important because first impressions are usually more lasting. Moreover, in many cases customers have only this initial contact as a basis for forming their opinion about the utility. However, it is the aggregate of these first and all the succeeding contacts that moulds good or bad public relations.

On the Pacific Gas and Electric system employees make approximately 2,000,000 direct personal contacts with customers each year. These involve transactions consuming anywhere from two minutes to an hour. In addition there are many thousands of contacts regularly made each month in the reading of 1,265,000 gas and electric meters, in presenting approximately 600,000 bills for service and in receiving payment at cashiers' windows. Finally there are some 800,000 telephone calls which are handled on company switchboards.

The total of these millions of contacts reflects in the minds of the customers just one thing—the company. And it is the same with any similar business. The character of the company is definitely delineated by these thousands of daily transactions over the counter, over the telephone and in the field. If even a small percentage of these contacts is bad, then the character of the company is bad in the minds of the customers. The problem is to make the greatest possible number of these contacts favorable to the company. One negative contact blots out all the good derived from many favorable contacts. Contacts of a mediocre type which leave the customer on the fence are of no value to the utility. Complete satisfaction must be given in every case. Interest and sympathy in the customer's side of the transaction is extremely important. Proper attitude is paramount—a smile where one is needed, sympathetic and serious demeanor where the customer's mood indicates this is necessary. Winning an argument with the customer only aggravates him all the more, leaving him oftentimes bitter and resentful.

There is no universal prescription by which every public contact can be made to produce the favorable results desired. However, there are two essentials which any business can apply with profit. These are greater care in the selection of personnel for public contact work, and educational training. Application of both of these will put the business machine in better working order to win public respect and confidence.

Pacific Gas and Electric Co. has been following two general methods of direct educational work with its public contact employees. One is the conference method and the other is known as the dialogue method.

The company found out by complaint analysis that public contact employees lacked information. They were not properly informed with regard to interdepartmental relationships. There were indications of passing the buck to the other department. A great many questions were asked them by customers which they could not answer, and many they would answer incorrectly. They did not completely understand the company's policies. Sad, but true, it was evident that there was no way for them to obtain the necessary information except by experiences under the hit-or-miss method.

As a result there was organized an educational manual for public contact employees. There were six courses of ten lessons each in all. These courses were designed to apply to six different types of public contact employees, such as meter readers and collectors, servicemen, telephone operators, counter clerks.

After the courses were prepared, conference leaders were selected from supervisory positions. These were first instructed in the fundamentals of conducting the classes. Then schedules of what employees were to take the respective courses were set. Notes were taken of all questions raised by employees and forwarded to the general office where two conference directors digested the questions and formulated standard written questions and answers for use of all groups throughout the system. At the completion of each course there was one lesson for review, and finally a lesson as sort of an examination when employees were required to answer in writing a group of questions based on the course itself.

The classes lasted approximately one and one-half hours—one hour on company time and one-half hour on the employees' time. This worked very satisfactorily.

The second phase of training work was based on the information gained during three years of educational work under the conference method. There were issued to all public contact employees, in printed form, some 200 fundamental questions with answers. This second phase of training was called the dialogue method. It consisted of case problems based on actual experiences. Employees were given specific problems to handle before the class, and thereafter the balance of the class would criticize the manner in which the individual handled the problem.

This educational training also de-

veloped better relationship between departments and clearer understandings and appreciation of the other fellow's job—all to the advantage of the customer and the company.

For the past eight or ten years the company has been developing throughout its system an organization of highly trained specialists who make personal contacts in the field on the more aggravated complaints rather than handle such matters by correspondence or telephone. Most of the transactions handled by these specialists are those where the customers have already set themselves definitely against the company for some reason or other. They are usually intelligent and more or less influential people who can speak their minds with force and conviction and when they condemn the actions of the utility their word carries considerable weight with their acquaintances. The job of these specialists, who are schooled in all phases of tact, is to convert these customers to believe in the fairness of the company's intentions and to straighten out the misunderstandings so that they are left with a better taste in their mouth. Leaving one of these aggravated customers disatisfied to work on his friends is like leaving one bad apple in a barrel of good ones. In a short time they are all bad.

In the sales department for the past four years a systematic survey of all customers has been made. Territories incorporating anywhere from 2,000 to 3,000 customers have been allocated to a sales representative who handles all domestic sales activities in his respective district. He is required, in addition to his regular sales work, to make a certain number of surveys each week. The survey consists of an inventory of the appliances in each home and their condition. From this information a complete market analysis of the territory is now available.

In this survey work, the salesman makes no direct attempt at selling during his interview unless the customer encourages it. The purpose of the salesman's call is explained to the customer —the company is anxious to maintain closer contact with its customers, to learn better methods of rendering service and to inquire from the customer if he has any suggestion which can improve service. The representative offers to check over all appliances. If there is anything that needs attention from a service viewpoint he instigates the order on the service department and the work is taken care of the next day. He, incidentally, notes and records the inventory of appliances.

Since the institution of this survey work, thousands of minor complaints, which otherwise would never have come to the company's attention, have been adjusted. Thus grievances formed in the minds of customers through misunderstandings are cleared up.

Another by-product of this survey program is the allocation to dealers of prospects for appliances sold exclusively by them, such as refrigerators, vacuum cleaners, repair work, etc. Several thousand appliance prospects developed during the survey have been turned over to dealers and approximately 10 per cent have been sold by them. Approximately 135,000 of these survey contacts are made each year—105,000 domestic and 30,000 commercial, industrial and agricultural.

Improvements in customer contact come about rather slowly—too slowly, I believe. Personally I am inclined to believe that we in the utility business are still too complacent, due more or less to the monopolistic nature of the business. Service is, in most cases, excellent, but we cannot afford to rest on that thought. We have to judge from the angle of the customer. What kind of service is he used to? What other businesses is he comparing us with? What is his viewpoint on the subject of government ownership of electric utilities? We can't sit back and rest on the conclusion that the customer is getting far more for his money from the utility than he is from other businesses. He takes the matter of continuous service for granted. He doesn't look beyond the appliance using the service and the chances are that we can do little about that.

We can impress him, however, with *service*, and I believe that this is the only sure way to sell the real value of the private utility to him. Deeds well done are what count. Each contact should be made to pay from a good-will building standpoint.

We still have to study ways to reduce red-tape and ways to improve in the matter of giving service. We shouldn't judge the extent to which we should go in the matter of giving service on the basis of what the customer is entitled to receive. We shouldn't, with a wave of the hand, pass to others items of service that the customer thinks we should perform. We must continue to liberalize rules and regulations and get away from stereotyped practices. After all, building good-will is a problem of working with human nature. And we all know that plenty of flexibility is always needed if we want to get the right reaction.

If the utilities would capitalize to the fullest extent on the millions of contacts they are regularly making with their customers each day, I don't believe we would ever have to worry about competition from the government. However, it is the degree to which we perfect these daily contacts that determines how we are to be judged by the public.

Every contact, whether over the telephone, over the counter or in the field, should be made a favorable one. Many a contact accomplishes the particular objective in a mechanical way; where we fall down is in our failure to make the contacts *register*. Just a little more polish will put over the lasting qualities of an interview which otherwise might be only mediocre.

One training ground for P. G. & E. employees—the conference

P.G.& E. Puts in West's First High-Voltage Oil Cable

By J. A. KOONTZ
Assistant Engineer
Pacific Gas and Electric Co.
San Francisco

ADDITION of steam generating equipment at Oakland steam plant necessitated the provision of 60,000 kva. of additional tie-line capacity between this plant and the transmission system of Pacific Gas and Electric Co. It was soon evident that it was more expensive to provide this tie capacity at 12 kv. than to transmit the power at 120 kv. for such a large block of power.

The cable used is underground, of the single-conductor, oil-filled type, having a copper section of 500,000 circ. mil. The conductor is insulated with 500 mils (½ in.) of wood pulp paper, consisting of some 80 or more tapes. The cable core is finished with 141-mil (9/64-in.) sheath of copper bearing lead. Finished diameter of this cable is about 2.3 in., and the weight is 8¼ lb. per ft. The oil channel is at the center of the conductor and is formed by a flat spiral spring having an inside diameter of ½ in., and an outside diameter of 0.6 in. Two layers of copper consisting of approximately 44 strands are placed over this spring core. All of this is shown in detail in Fig. 1.

The use of single-conductor, oil-filled cable required a careful study of the duct line. In this case it was necessary to route the cable around numerous curves and corners and along streets in which there is a difference in elevation of over 150 ft. in 6,000 ft. This change in elevation required numerous stop joints. Stop joints are necessary to limit the maximum head of oil on any one section of cable to not over 37.5 ft. where single-sheath cable is used. Double this head may be taken care of if a reinforced, double-sheath cable is provided. From a survey of the line and by weighing all the factors involved, it was soon evident that no economy would be obtained in this case by using double-sheath cable, as the grade, angles, and maximum lengths of cable that could be used economically made it impossible to eliminate more than one manhole. This would not warrant the extra expense of reinforced cable sheath.

In the design of the duct line, ducts were placed with the minimum practical separation between phases to reduce the induced sheath voltages for a given length of cable to a minimum value. By using 3½-in. duct and spacing same 1 in. apart, it is permissible to locate the manholes at a maximum of 730 ft. apart without exceeding the value of 12 volts to ground on the ungrounded end of such a length of cable when carrying a current of 385 amp. Twelve volts to ground is the maximum that it has been found safe to operate without causing sheath corrosion. These restrictions, one will note, required a careful survey of the duct line in order that the manhole locations would be such that the 37½-ft. difference in elevation between stop joints would not be exceeded and, at the same time, that no cable runs would exceed 730 ft.

All joints in the single-conductor cable are provided with sheath insulators and the three cables are tied together and grounded on one end of each run, the other end being kept free from ground. Stop joints are provided where it is necessary to prevent exceeding 37½-ft. head on the cable or in the level portion where it is necessary to feed oil into the sections.

The connectors at the cable joints are pressed on the ends of the cable with a hydraulic press. This operation materially reduces the time for joining the conductor and also eliminates the possibility of carbonized oil being left in the cable core. It is difficult to solder connectors onto an oil-filled cable and at the same time keep a small amount of oil running out the oil channel, as is required to prevent air from entering the cable.

Standard joints are made by carefully stepping the insulation on each end of the two conductors to be joined, then building up the joint with low-loss varnished-cambric tape in a manner similar to that in lower-voltage cables. The tape used, however, is dried and vacuum packed under oil and shipped in sealed containers. A special heavy cable oil is used between the layers of tape as applied to the cable. The tape is built up to the required thickness of insulation at each end of the stepping to a little over twice that used on the main sections of the cable and at this point is terminated the conducting covering of the stress cone. The central portion of the tape is reduced somewhat in diameter so that a barrier tube with centering collars may be placed over same. This tube is to hold the cable joint centrally within the joint casing. It also provides an insulation barrier reducing the thickness of oil sections and thus increasing the voltage break-down strength of the joint. The two halves of the casing which were

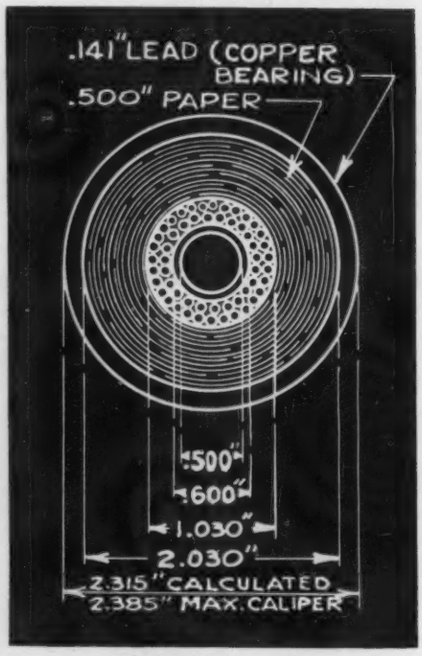


Fig. 1

first slipped over the cable before pressing the connectors are slipped back into position and the casing wiped in place. The joint is then evacuated and filled with degassified oil.

Stop joints are essentially two potheads connected end to end within the joint casing. The half connectors are pressed on the cable and the ends are taped in a manner similar to the standard joints, except that each end is built up in cone shape, (see Fig. 2) a stress shield being provided next to the sheath. The taping of this cone is made to fit inside the cone shaped insulating barrier which is held by suitable oil-tight gaskets at the periphery of the casing and at the small end of the insulating cone. Oil passages are provided through the copper sleeve and

out along grooves underneath the cone shaped insulating barrier. In this manner a long leakage path is provided over the insulation between conductor and ground for the oil channel through which the oil flows between the cable core and the supply reservoirs.

For that portion of the line where maximum grade is encountered, the distance between stop joints is relatively short, and these sections are fed from the end of maximum elevation by gravity-type oil reservoirs. In the level sections the cable is fed from the stop joints at each end. These sections for this dimension of cable may be as much as 3,000 ft. apart. The reservoirs used at such locations are of the balanced pressure type.

The 18,000 ft. of duct line is divided into eleven sections: two are terminal sections, or portions of cable between the cable pothead and first joint; four sections are fed by gravity reservoirs; one section fed by gravity and balanced pressure; while the remaining four sections are fed by balanced pressure reservoirs.

All reservoirs consist of a series of flat circular flexible metal cells which are connected to a manifold. The oil is placed on the inside of these cells. In no case does the cable oil come in contact with air under operating conditions. With the gravity-type reservoir the cells are placed in a metal container, which in turn is partially filled with oil. This outer metal container is vented to the atmosphere. The oil level on the outside of the cells will vary with the amount of oil in the cells; hence, a determination of the elevation of this outside oil may be used as a gage for measuring the cable oil in the reservoir. Suitable sight gages and floats are used, the latter to operate alarm contacts to give warning if the oil is high or low within the reservoir.

In the balanced pressure reservoirs, the oil is still kept on the inside of the cells, which are similar to those used in the gravity type, but the container which holds the cells is sealed and gas injected. The pressure of this gas is adjusted to take care of the necessary oil head to provide proper flow to the section being fed. By using gas, which is an elastic medium, and the proper ratio of gas to oil volumes, it is possible for the cell to receive or give out the necessary oil, depending on the cable demand, without a great change of pressure. Selection of size of reservoir and proper adjustment of gas pressure are made to suit each section of cable to be fed.

To take care of sheath grounds it was felt advisable to carry a ground conductor in the duct system, because, at various points along the duct line, it would be difficult to obtain a low-resistance ground. An insulated ground cable is carried through the length of line. Grounded at the most advantageous points, this will serve properly to drain the stray currents. For about one-third its length the power cable is on the same street with the electric railway tracks. The ground cable was insulated for two reasons: first, it was not felt advisable to carry bare copper through certain soils as it is possible to get severe corrosion with the lead when both are located in the same trench; second, the possibility of using cathodic protection, if such should be found necessary, is provided for.

A cable approximately 3½-mi. in length presents a rather difficult relay problem except for pilot wire operation; hence, pilot wires are carried

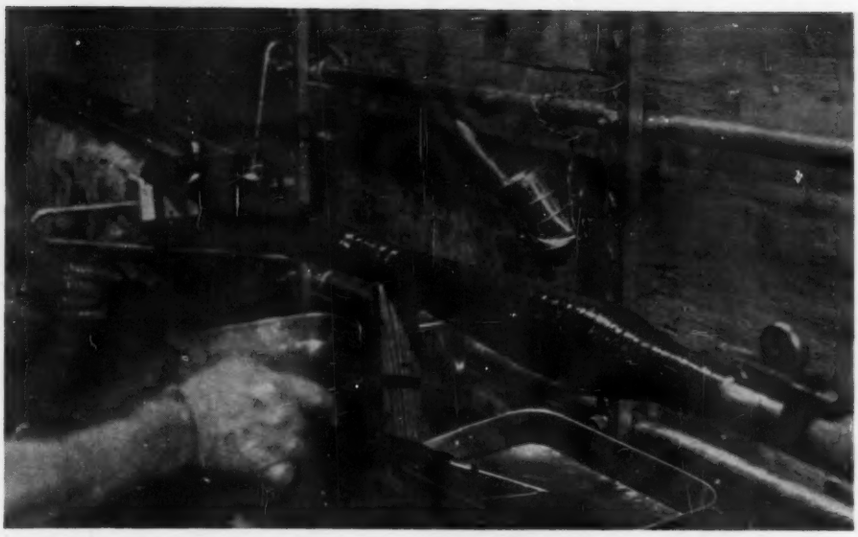
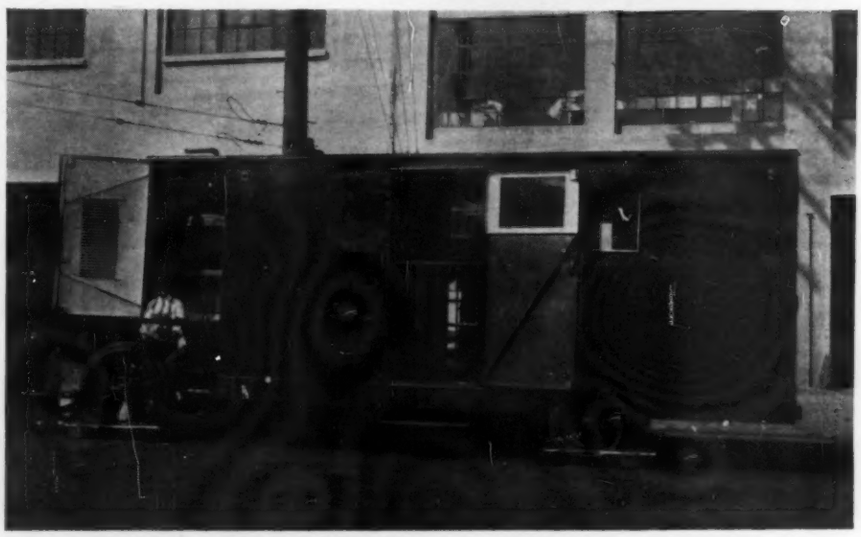


Fig. 2

Fig. 3

Fig. 4



in the duct line for this work. Also provided are alarm cables which will indicate high or low oil level in any of the feeder reservoirs. A rather simple alarm system has been provided, namely, a circuit closing device, on each reservoir, which will close its contact with either high or low oil. This will ring an alarm, and after the proper voltage has been impressed, resistance steps will indicate the man-hole in question so that the trouble can be readily found and checked.

Terminals are of oil-filled type and are provided with capacitance taps. These make available potential for directional relays. Simple current transformers are used, namely, clamp-on type, over the lead sheath. In this way, it is possible to use low voltage current transformers and still get reasonably accurate results, as the cable sheath will be isolated from ground at the end where the current transformers are applied. Hence there should be practically no interference from sheath currents.

Four 3½-in. soapstone ducts are carried in concrete in square configuration. Three of these carry the oil cable while one of the upper ones carries the control cables. A 2-in. soapstone duct in a lower corner of the concrete is provided for the ground. The concrete is 1 ft. 4 in. square in section, 3 in. being the minimum distance from the edge of concrete to one of the four main ducts. Minimum distance from pavement to top of concrete is 2 ft. 6 in.

Fig. 3 shows installation of standard joints as erected in the manholes.

High voltage cable requires extreme care during the installation and splicing periods. To facilitate this work a special trailer was constructed on which are mounted a gas-driven generator, to supply power and light, motor driven de-gassifier equipment, with the necessary oil pumps and automatic heater control, and other special equipment necessary for making and treating joints in the field. This trailer provides a dry, clean working space over the manhole and it is located directly over the hole in which splicing is to be done and remains in this position throughout the splicing period. Access to the manhole is provided through an opening in the trailer floor and a canvas cover is placed between this floor opening and a ring placed in the manhole casting. This permits the workmen while splicing to be free from dust, rain, and outside disturbance. This trailer is shown in Fig. 4.

The 54,000 ft. of single-conductor cable for this line is being furnished by four manufacturers. This month finds installation more than 60-per-cent completed, and the tie is expected to be energized sometime this fall.

Treating Plant Cuts Cost in Wood Preserving

Construction of Complete Equipment for Soaking and Handling Justified on Basis of Single Flume Job

Arsenic Trioxide Is Used

BY spending $12,000 to construct a plant for soaking timber in arsenic trioxide, Stone & Webster Engineering Corp. was able to effect a considerable saving on wood treatment in connection with rebuilding the flume to Puget Sound Power & Light Co.'s Electron hydro plant. Charging off the entire plant cost to the one job, cost of treating amounts to $7 per 1,000 board ft.

The method of treatment was selected by H. F. Anthony, project manager for Stone & Webster, following studies of the performance of arsenic-treated timber utilized in mining operations. Examples were found where arsenic-treated wood had been in service 10 years without showing appreciable aging, while untreated wood in the same locations was badly deteriorated.

Anaconda Copper Co. was found to have used a pressure process successfully, employing a 4-per-cent arsenic trioxide solution, but as the cost of pressure equipment is high, a method of treating under atmosphere was sought.

Accordingly, experiments were undertaken to discover how effective nonpressure treatments might prove. Experience of the Puget Sound company, which had used open tank processes for a number of years, was a valuable guide.

By giving various treatments to samples of wood that was to be employed, namely Douglas fir, it was found that suitable hot and cold baths would produce penetrations of the chemical in the wood as follows: 300 to 450 parts per million ½ in. in the wood, 75 to 125 parts 1½ in. in the wood, both measurements being taken near the center of the piece, away from the ends. These penetrations were deemed sufficient.

For carrying on this treatment, a complete plant was built. Its essential elements are: facilities for handling material, treating tank, and a system for mixing, circulating and maintaining hot and cold baths.

The tank is 45 x 12 ft., 4 ft. deep, welded together from 3/16-in. steel plates. To keep down heat loss it is insulated on the sides with 4 in. of sawdust and at top by wood covers which are kept in place during the hot bath.

Resting on 8 x 12-in. joists over 8 x 8-in. sills, it is flanked by walkways and surmounted by a shed roof and wood structure, the latter supporting the two 5-ton travelling hoists which are used for handling lumber. Wood is moved in bundles which set side by side when placed in the tank.

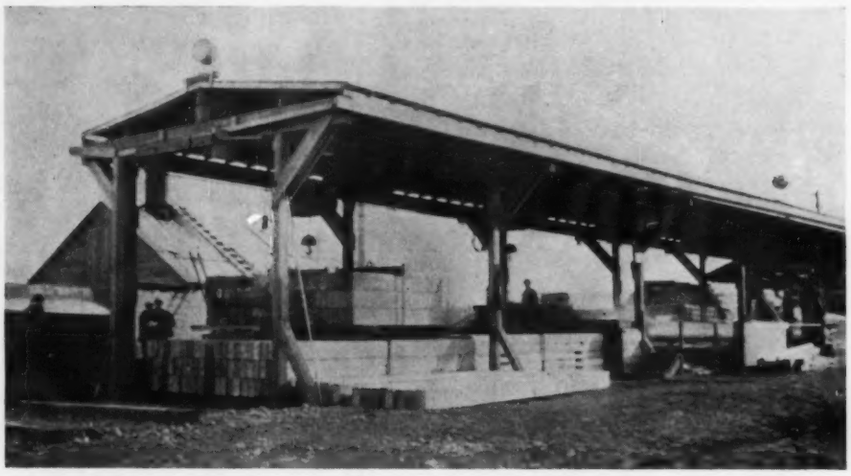
Fluid for the baths, a saturated solution of arsenic trioxide running about 4-per-cent by weight, is prepared in a 300-gal. mixing tank. This has a cone-shaped bottom through which compressed air is admitted by a valve to agitate a mix This is prepared by sift-100 to 105 lb. of the powder into boiling water.

A 500-gal.-per-min. pump is used to feed either the hot or cold storage tank, a 7,000-gal. charge being maintained in each. The pump is also used to transfe fluid between the storage and treating tanks.

About 15,000 board ft. of timber are placed in the treating tank at a batch and subjected to the 7,000-gal. hot bath for 6 hr. Temperature of 206 deg., maximum for the particular equipment and elevation, is maintained by circulating steam through coils located in the bottom of the tank. The steam is supplied from a 120-hp. boiler burning fuel oil.

At the end of 6 hr., the hot solution is pumped to the hot storage tank, and the treating tank is refilled from the cold storage tank. The cold bath is continued for 4 hr., during which time cold water is circulated through the coils to draw off residual heat.

A complete operating crew consists of seven men. Under 24-hr. operation, all handling can be accomplished dur-



ing two shifts so that one man can keep the plant operating during the third. Thus 15 men can turn out two 15,000-board-ft. batches in a 24-hr. day.

Cost of operation, roughly one-third for materials including fuel oil, and two-thirds for labor, amounts to $5 per 1,000 board ft. Overhead of course varies inversely with the amount of wood treated. This quantity on this job was 6,000,000 board ft., making plant cost equivalent to $2 per 1,000 board ft.

With the plant in normal operation, absorption was checked and found to amount to 25½ lb. of arsenic trioxide per 1,000 board ft. of treated lumber. Operation also brought to light possibilities for improvement if another plant were to be built. Artificial cooling of the cold storage tank should be considered, because the cold bath absorbs considerable heat from the hot timber and has a tendency to warm up. In this job, timber was purchased already cut, bored and dapped, and tanks and bundles were designed for minimum waste space. However, in a job where there was less variation in the size of pieces further economies might be effected by increasing the ratio of board feet to gallon of bath.

Although a few men appear to be allurgic to arsenic trioxide. working with the chemical has proved less hazardous than anticipated. Three cases of occupational disability were reported during the time the treating plant operated. No further trouble was experienced after these men were removed from this work. The percentage of cases reported during construction, in handling treated lumber, was higher, but none has proven serious.

For accident prevention, 10-per-cent sodium thiosulphite solution is kept at hand, and men are instructed to use this for washing the hands and face. For eyes and throat and for internal use when necessary, weaker solutions are provided. Skin abrasions are further treated with applications of 10-per-cent zinc oxide ointment or 2-per-cent thiosulphite lanolin. On construction, a first-aid man is in constant attendance to instruct workmen and to treat arsenic burns.

The Electron job embraced treatment of timber sills, stringers and frame members only. This may not, however, represent maximum economy in all cases. On the other flumes, on surfaces exposed to moving water, treated timbers have been observed to be moss-free where adjacent timbers were not.

Success with the operation of the treating plant at Electron points to the possibility of similar applications elsewhere, its having been demonstrated that costs can be met upon treatment of a not excessive quantity of lumber.

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A. I. E. E. Portland Convention

Western members of the American Institute of Electrical Engineers will journey to Portland next month when the Pacific Coast convention will be held Aug. 9 to 12, at Multnomah Hotel. E. F. Pearson is general chairman.

The meeting will open on a Tuesday, close on a Friday, when delegates may chose from a number of inspection tours including those to: Bonneville Dam and Timberline Lodge, Ariel hydro plant, Oak Grove plant, Pac. Tel. & Tel. Co. plant, steam plants, 110-kv. submarine cable crossing, under-ground systems, etc.

New Northern district vice-president this year is Lester R. Gamble, Washington Water Power Co., who, together with the following hold-over officers, makes up the West's representation on the Institute's board of directors: J. P. Jollyman, Pacific Gas & Electric Co., San Francisco; L. N. McLellan, U. S. Bureau of Reclamation, Denver, and R. W. Sorensen, Calif. Institute of Technology.

Being arranged by Walter Brenton, the preliminary program is as follows:

Tuesday, Aug. 9

10 A. M.—GENERAL SESSION

1. "Engineering Orientation", by John C. Parker, national president.
2. Address, by a national officer, Institute of Radio Engineers.
3. "The Atom Smasher", by A. W. Copley, Westinghouse, San Francisco.

2 P. M.—GENERAL POWER APPLICATION AND PROTECTIVE DEVICES

1. "Static Power Limits of Synchronous Machines", by Charles F. Dalziel, U. of Calif.
2. "Self Excitation of Induction Motors", by C. F. Wagner, Westinghouse, E. Pittsburgh.
3. "Trends in Design and Arrangement in Hydraulic Plants", by C. C. Whelchel, General Electric, Schenectady.
4. "Practical Applications of Copper Oxide Rectifiers", by E. W. Morris, Westinghouse, Los Angeles.
5. "Bismuth Bridge Magnetic Flux Meter for A. C. Fields", by George S. Smith, U. of Washington.
6. "Application of Deceleration-Test Methods to Determination of Induction Motor Performance", by Raymond W. Ager, U. of California.
7. "Electric Power System and Pumping Plants Along the Colorado River Aqueduct", J. M. Gaylord.

Wednesday, Aug. 10

9 A. M.—SYSTEM INTERCONNECTION AND OPERATION

1. Symposium on Operation Proves Design of Boulder Dam Transmission Line.
   (a) "Mechanical and Electrical Capability", Wm. S. Peterson.
   (b) "Corona", Wm. S. Peterson and Bradley Cozzens.
   (c) "Insulation and Lightning Protection", Bradley Cozzens.
   (d) "Carrier Current Installations", J. D. Laughlin.
   (e) "Relay Installation", L. L. Draper.
2. "Phase Angle Load Control", B. W. Hamilton and R. E. Pierce, Ebasco Services, Inc.

2 P. M.—GOLF, SWIMMING, ETC., STUDENT SESSION

9 P. M.—INFORMAL DANCE

Thursday, Aug. 11

9 A. M.—COMMUNICATION AND ELECTRONICS (Joint Session with I. R. E.)

1. "An Image Transmission System Suitable for Telephone Signal", Skellett.
2. "Devices for Controlling Amplitude Characteristics of Telephone Signals", Norwine.
3. "Loud Speaker Considerations in Feedback Amplifiers", Knowles.
4. "Some Developments and Problems of Demountable Tube Design", Litton.
5. "Practical Application of Facsimile Broadcasting", Singleton.

2 P. M.—TRANSMISSION AND DISTRIBUTION

1. "Sphere-Gap Polarity Limits", F. O. McMillan, Oregon State.
2. "Space Charges Due to Corona at High Alternating Voltages", W. G. Hoover.
3. "Humidity and Other Factors Affecting Arc-Over Voltages", J. V. Lebacoz.
4. "Corona and Sparkover Behavior in Gases at High Pressure", H. H. Skilling, Stanford.
5. "Operating Experiences with Capacitors", J. H. Foot and J. A. North, The Commonwealth and Southern Corp.
6. Economics of Large vs. Small Distribution Substations and Adaptability of Unit Substation Equipment", Hobbs and Parsons.

7 P. M.—BANQUET

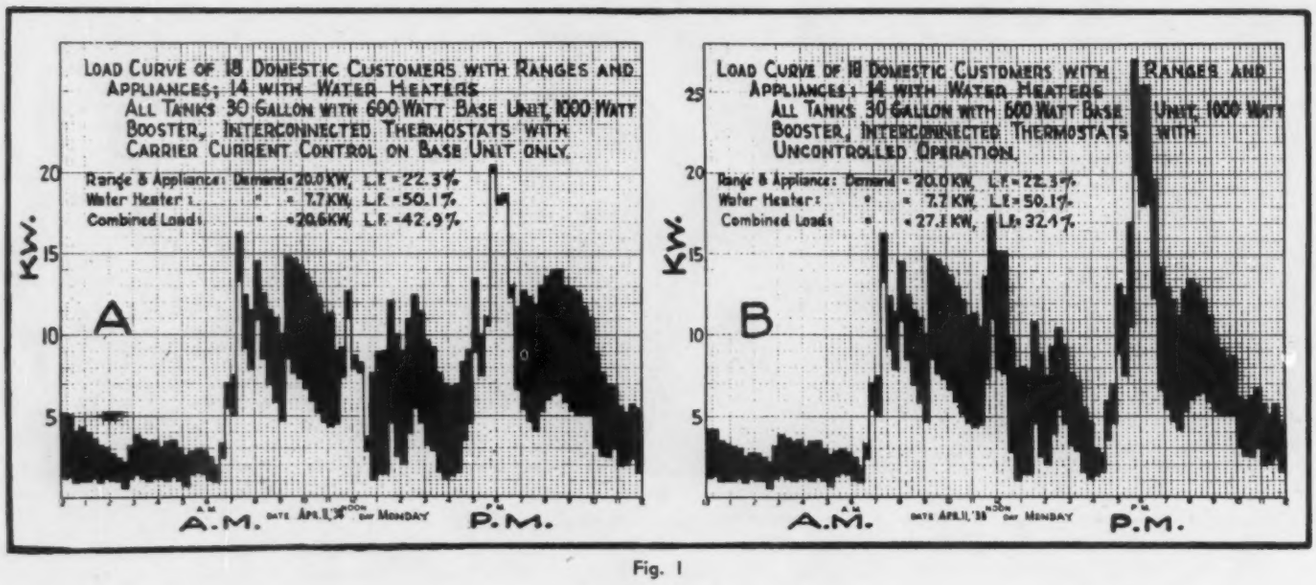

LOAD CURVE OF 18 DOMESTIC CUSTOMERS WITH RANGES AND APPLIANCES; 14 WITH WATER HEATERS
ALL TANKS 30 GALLON WITH 600 WATT BASE UNIT, 1000 WATT BOOSTER, INTERCONNECTED THERMOSTATS WITH CARRIER CURRENT CONTROL ON BASE UNIT ONLY.
Range & Appliance: Demand = 20.0 KW, L.F. = 22.3%
Water Heaters: " = 7.7 KW, L.F. = 50.1%
Combined Loads: " = 20.6 KW, L.F. = 42.9%
KW.
A
A.M.
P.M.
LOAD CURVE OF 18 DOMESTIC CUSTOMERS WITH RANGES AND APPLIANCES; 14 WITH WATER HEATERS
ALL TANKS 30 GALLON WITH 600 WATT BASE UNIT, 1000 WATT BOOSTER, INTERCONNECTED THERMOSTATS WITH UNCONTROLLED OPERATION.
Range & Appliance: Demand = 20.0 KW, L.F. = 22.3%
Water Heaters: " = 7.2 KW, L.F. = 50.1%
Combined Loads: " = 27.1 KW, L.F. = 32.1%
KW.
B
A.M.
P.M.

Fig. 1

Water Heaters and the Distribution System

By EUGENE VINET
Engineering Department
Edison General Electric Appliance Co., Inc.
Chicago, Ill.

ANY business which in 1937 was responsible for adding 350,000,000 kw.-hr. of domestic load to the nation's electric systems is certainly worth the closest attention of executive, engineering, and commercial departments of this electric business of ours. The increase of water heater load in the last five years is estimated to have added to the utilities a yearly energy consumption of about 1,000,000,000 kw.-hr. and, assuming an average rate of 1c, an increased annual income in the last five years of some $10,000,000. And the remarkable thing is that most of this business is being obtained with little if any additional plant capacity.

In times of recession, as now, the steadiness of domestic load is of paramount importance to most utilities, and the benefits of major appliances are all the more enhanced. Most important are the electric range and the electric water heater. The first is an indispensable commodity, becoming more and more an accepted standard of modernity. The second, being also an indispensable commodity, which anchors the first, can be made to dovetail perfectly in the economic operation of a utility.

Because of its unusual simplicity, water heating has received either no attention by engineering departments, or just enough apparently to justify a utility in continuing the particular scheme it has happened to adopt.

NORTHWEST ASSOCIATION REPORT

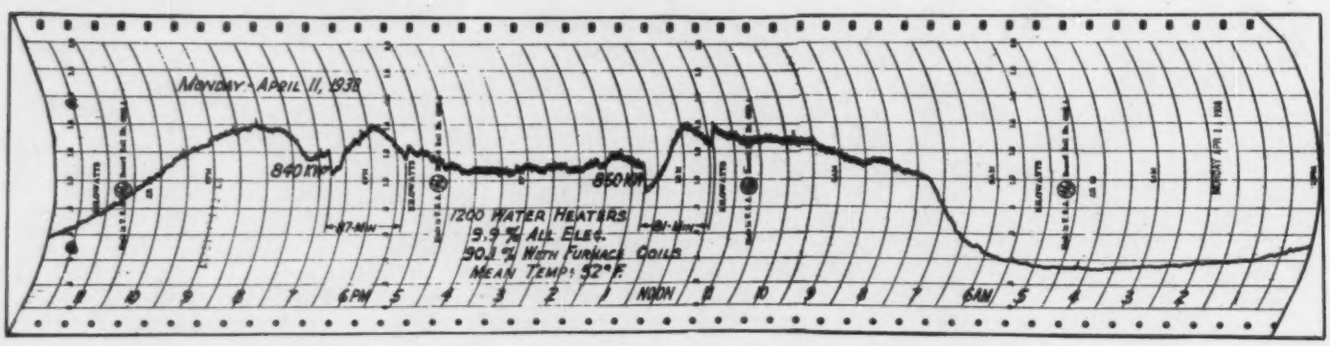
Presented at the 1938 meeting, **Utilization Committee**, Walter Brenton, chairman (Devices Sub-Committee, O. D. Lanning, chairman), Engineering and Operation Section, Northwest Electric Light & Power Assn.

If water heating is to continue its rapid progress, thorough attention must be given the problems it introduces. Particularly must effort be directed toward standardization of equipment. This is so far almost nonexistent, but it can be brought about. Standardization can exert a marked influence on prices of equipment, with consequent benefit to utilities and consumers.

Opinion on the merits of schemes now in use for obtaining water heating load is divergent. Points of debate include: whether heaters should embrace high-wattage units with small-capacity tanks, or the so-called 24-hr. low-wattage tanks, or time-controlled low-wattage with cut-offs for either lower or both units, or whether heaters should be strictly night storage with short charging hours and large storage tanks.

The West has pioneered in water heaters and it is therefore natural to look to this region for data. A tendency for a system to stick to the particular scheme it has happened to adopt and to favor this over others simply because it has it, may be an obstacle to progress. But if the performances of various schemes on different systems are con-

Fig. 2



stantly studied and brought to the attention of the industry, superiorities will be appreciated that much sooner, and the industry will be brought that much closer to the benefits of more standardized practice.

Fig. 1 shows data taken on the Idaho Power Co. system this year. These curves are for 18 domestic customers on the same distribution transformer with ranges and appliances, 14 having water heaters. The black areas show the water heater load superimposed on the range and appliance load, and Chart A at the left demonstrates how carrier current control on the base unit only (bottom) raised load factor to 42.9 per cent as compared to the 32.9 per cent shown at the right (Chart B) without any time control. (Estimated.) Although this is a Monday curve, traditionally washday, only 35 watts of demand per heater are added by the uncontrolled upper unit. Some of the upper units were less than 1,000 watts. Because some seasonal variations probably will occur, these data are regarded as preliminary and will be supplemented by subsequent studies by the operating company.

Incidentally, it should be noticed that the demand responsibility of the range over and above the 8:30 p.m. lighting demand is only about 770 watts per range.

Fig. 2 shows the substation load-curve taken on the same day as that shown in Fig. 1 with carrier-current cut-offs during noon and evening periods. It is to be noticed that considerably more load is picked up at the end than dropped at the beginning of the cut-off periods owing to the use of hot water. Also that the curve was leveled down to four even peaks at 11:25 a.m., 11:50 a.m., 5:50 p.m. and 8:10 p.m. Quite likely, also, more load will be dropped when the mean atmospheric temperature is higher than 52 deg. and no furnace coils are used.

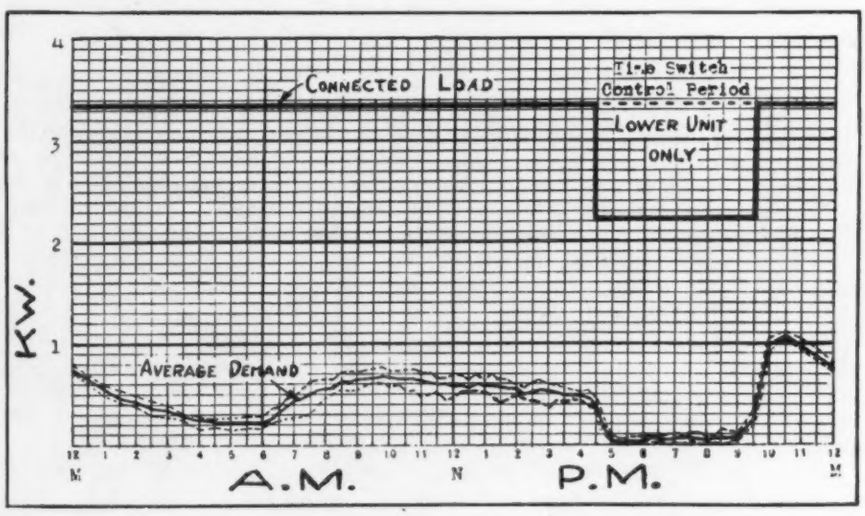
Fig. 3 is for another large Western utility. This shows a combined load curve for 100 water heaters selected at random and might be taken as typical for this type of load on a distribution substation. The period from 4:30 to 9:30 p.m. indicates the effect on the load curve of disconnecting a given portion of the load—namely, that represented by the base units. It shows the remarkable diversified demand of 50 watts per heater for the uncontrolled upper unit.

If these curves are considered in connection with various other diversified water heating curves, it is quite evident that no one particular time schedule can fit into all the various utility system load curves that are encountered, and that the selection of the proper cut-offs or charging hours is dependent to a large extent on whether a utility has an evening or morning peak, and also, whether costs of distribution overshadow those of transmission and generation.

But for the general case it seems evident that the time-control, low-wattage, twin-unit storage tank with short cut-offs for the primary unit (lower) during predominating peaks, whether controlled by time switches or carrier current, would offer the most economical and best balanced program for all concerned, customers and utilities alike.

Fig. 3—Water Heater Test Summary 100 Installations of Various Sizes and Manufacture Selected at Random:

	24-Hour	
Average Connected Load, kw.	3.36	
Average Consumption, kw.-hr.	10.56	
Average Demand, kw.	0.440	
15-min. Maximum Demand, kw.	1.08	
Load Factor	41%	
Average Wattage, Lower Unit, kw.	1.120	
Average Wattage, Upper Unit, kw.	2.240	
Average Tank Size, gal.	44.8	
Number of 30-gal. Heaters	31	100
Number of 40-gal. Heaters	25	
Number of 50-gal. Heaters	37	
Number of 66-106-gal. Heaters	7	



Not Plotted

Here's experience contained in no scholarly engineering paper or austere stockholders' report. Properly so. But it's the stuff that's talked about, long after statistics are forgotten. If you have such accounts, send them to Electrical West. We'll pass the word around.

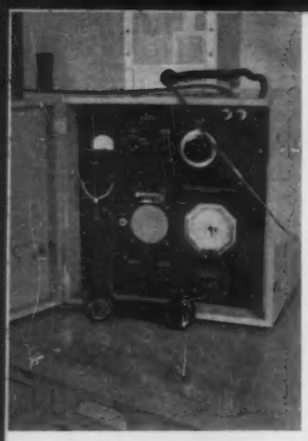
At Bonneville last month they were testing main units. Among other things, they ran them at 205 r.p.m. They're rated at 75. Charlie Cutter of Pac. Electric Mfg. was in the powerhouse at the time. Now 775,000 lb. is a lot of weight to be swinging around at 205. The peripheral speed is 231 mi. per hr. "I got the hell out of there," Charlie said. "They're fine machines, you know, fine machines. But just suppose. Why I'd pass over Portland like Haley's comet. Yeh, I would at that." Recalling that manufacturers run such tests in well guarded pits, and that the army doesn't even fire a 3-in. field gun in peace-time without digging in first, Charlie's evacuation looks like sound practice, at that.

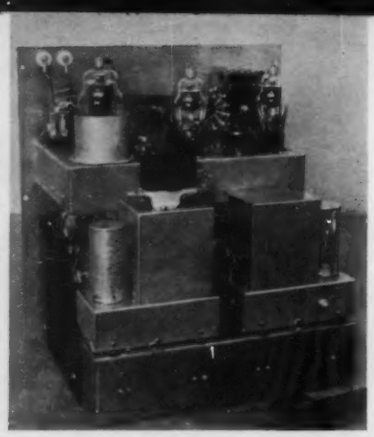
One night a station operator of a Western utility thought he'd brush up a bit on his operating practice. Things were quiet, and it looked like an excellent chance to smooth out his technique of shifting load, prepare for an hour when such skill might be invaluable. Well, in no time at all he was throwing load from machine to machine, and all over the plant with the greatest ease. But like the fellow who won the competition for leaning farthest over the cliff, he extended himself too far. Presently he had no load at all. Next morning he got a call from the superintendent, who, in effect, wanted to know just what had been going on. The operator gave an honest account. Day after, a neat package arrived. It contained a game, made up of shiny steel balls and gadgets, arranged to afford endless moments of fascination. The box also contained a note from the superintendent: "Next time you have to play, please substitute this for the main units."

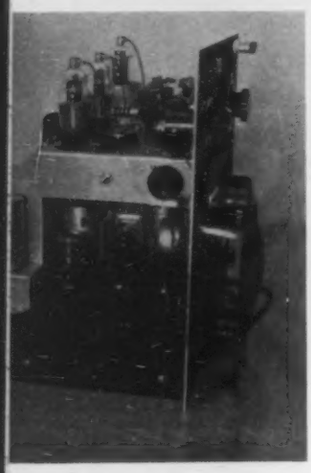
During the Los Angeles flood a certain telephone exchange lost its power, and its batteries began to run low. After some figuring it was found that Edison could feed into a Bureau transformer and thus temporarily supply the exchange. Fred Doolittle of Edison was working out these details by telephone when the operator told him she was sorry but it would take four hours to get the next call through. "Well that's kind of unfortunate," Fred said, "because I was just trying to arrange for getting power into your exchange, and I know that before four hours are up the batteries will be dead." "Oh. That," said the operator, "is an entirely different matter." Fred got his call——right away.

Two-Way Radios for Field Emergency

By A. O. MANGOLD
Asst. Engineer
Northwestern Electric Co.







(Top left) Set in case, with a.c. power pack on top. Right edge of case has space for log book (Right) Transmitter mounted over 6-tube superhetrodyne receiver, modulator section on bottom with receiver. Two vibrator units for supplying d.c. plate current from 6-volt battery are at bottom front. Crystal holder at top between tubes. Side view (left) shows antenna coupling

UNDER recent allocation of the ultra high frequencies granted by the Federal Communications Commission, to the light and power industries for emergency radio service, Northwestern Electric was the first system in the West and the second in the United States to obtain permission to construct and operate voice-modulated radio transmitting stations.

Although the transmitters are limited as to the service to which they can be applied, it is expected that the two new portable sets will be a valuable adjunct to the company's present wire telephone communication. They will be used in construction, maintenance, and repair of transmission lines, distribution circuits, and submarine cables during periods of distress occasioned by fire, storm, flood or other unusual circumstances. By quickly establishing radio communication between the scene of disaster and supply depots for men and materials, it is hoped that Northwestern Electric will be in a position to render a better public service.

Designed to operate with an output of 15 watts on frequencies of 31,600 and 35,600 kilocycles, but at present limited by license to 3 watts, the transmitters W7XDT and W7XDS, have been undergoing a series of tests prescribed by the FCC. The results have been most gratifying. With a simple vertical antenna of about 15 ft., the power radiated was found sufficient to cover the metropolitan area of Portland, and preliminary tests have resulted in satisfactory two-way communication between the company's headquarters in the Public Service Building in Portland and Washougal, Wash., 17 mi. up the Columbia River. It has been found, however, that in order to obtain maximum results for distance transmission, the sets must be so located that a minimum of obstructions intervene.

The two radiophones, identical in all respects except for transmitting frequencies, were designed and built by Radio Specialty Manufacturing Co. of Portland, in accordance with the latest features used by the U. S. and Canadian Government forest services. At present they are arranged for simplex operation, but can readily be converted to duplex service if desirable.

The radio frequency portion of the transmitter, consisting of a crystal-controlled, type-89-tube oscillator, a type-89-tube amplifier and a type-807, beam, power tube as a final radio frequency stage, occupies the top shelf of the set along with the crystal holder, tuning inductance and other minor parts.

The modulator section, consisting of a type-6L5 audio amplifier and a type-6V6 modulating tube, is mounted on the lower shelf and shares space on the latter with a six tube superhetrodyne receiver which employs a type-6L7 tube detector and mixer, a 6L5 oscillator, two 6S7 intermediate frequency stages, a 6L5-tube second detector, and a type-41 tube used as an audio frequency amplifier. On the rear of the lower shelf are mounted two Mallory vibro packs for d.c. operation of the sets when required.

Mounted at the top of the black crackle finish duralumin panel are: a combination meter which indicates filament and vibro pack volts as well as the grid and final amplifier plate current, an antenna coupling, and a final amplifier tuning control. Below the center is the receiving section of the panel. The combination microphone and conventional receiver hangs on a hook switch which in the "down" position cuts in a 4-in. dynamic speaker. In addition, a jack is provided for head phones. Above the speaker is a key switch for "transmitting" or "receiving," while in the lower right hand corner can be seen the master switch which cuts off all power to the set from its external power supply.

The entire chassis containing all parts of both transmitter and receiver, except the power supply, is housed in a light weight wood case finished in light gray enamel. A compartment to the right of the panel is provided for the log book. The two piece cover when closed holds the handset on the hook switch. The antenna connection is made to the binding posts located at the right top of the panel. Ready for transit, this part of the equipment weighs approximately 35 lb.

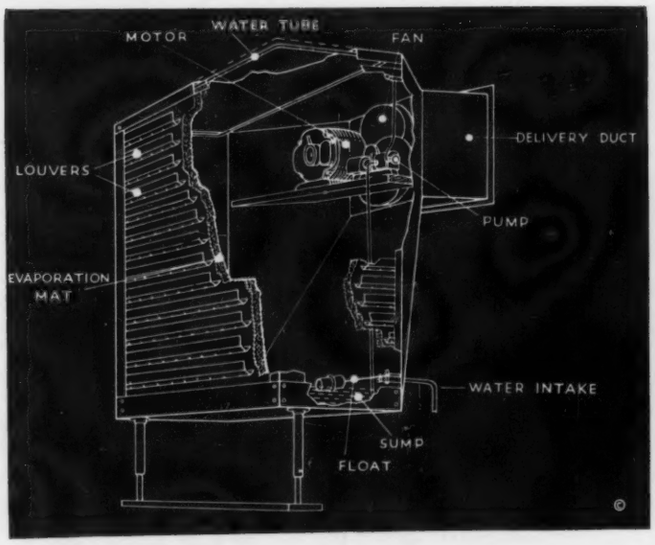
Distinctively different, these sets can be operated either from a 120-volt a.c. power pack or from a 6-volt storage battery. Conversion from one power source to the other is accomplished by merely interchanging the plugs attached to their power supplies. No other switching operation is necessary.

The a.c. power pack is of conventional design using a type-83 rectifier tube. The entire unit, which weighs about 10 lb., is entirley enclosed in a well ventilated aluminum case.

A 175 amp.-hr. 6-volt storage battery is provided for each set. A battery of this size, when fully charged, will operate the set 6 to 8 hr. continuously.

A third class radio operator's license, obtainable through examination, is required by the FCC for the person in charge. To pass the examination, a knowledge of the federal regulations generally referred to as radio law and the fundamentals of radiophone operation is necessary, no experience with code being required.

As stated, all of the preliminary tests were made with the use of a simple half-wave vertical radiator. A reflector type of radiator is being constructed at this time and it is expected that with the directive qualities of the new antenna, signal strength of the transmitter should be doubled.



After three or four years' experience with home-made desert coolers, G. A. Larriva, of Russell Electric & Machine Co., Tucson, Ariz., and M. L. Hoefle, of Hoefle Manufacturing Co., designed a factory job that uses treated fiber mats for filtering and cooling, louvers that are themselves water troughs trickling a curtain of water down the outside of the mats, a circulating pump to conserve water, a float valve on the water intake, and other details that increase its efficiency. The unit is also built low so that it obstructs only a small portion of the window, and is supported on adjustable pipe legs. A cut-away diagram at the left shows some of the details. Center—Even office buildings use evaporative cooler units in Tucson. An auto court (right) with two different types of coolers attached to windows

Desert Coolers

Called "Poor Man's Air Conditioning," they graduate from home-made to factory built

It is only natural that where the summers are hottest the idea of air conditioning should have grown most rapidly. But no one quite foresaw the way in which the first crude home-made "desert coolers" would be adopted by a populace eager for any kind of relief from the heat. And now that the number of these desert coolers installed and used runs into thousands instead of hundreds, it is only natural too that more efficient factory-built jobs are now appearing on the market. Likewise the fan manufacturers are offering special assemblies for use in desert coolers, either the home-made or the factory-built varieties.

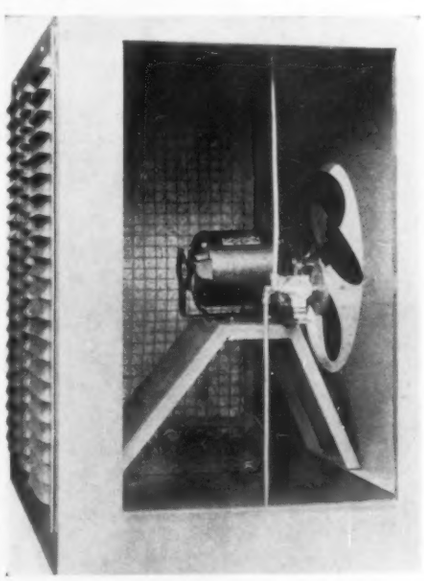
Utilities at first were quiet about these often "haywire" installations of a fan inside a box lined with excelsior kept wet by a dripping water pipe. They weren't air conditioning, but in many a poor man's house they were the only kind he could afford. It is estimated now that there are over 14,000 in use in Arizona. The Nevada-California Electric Corp. estimated that there are from 3,500 to 4,000 in operation on its lines, 2,000 of which were sold last year. The company itself sold 550 units of a manufactured make last year. Now that there are 8 manufacturers in the field, and dealers established to sell and service them, this utility feels that the desert cooler has the impetus it needed and can now be sold actively by the trade.

Central Arizona Light & Power Co. of Phoenix has made a special air conditioning rate on a day and night plan, since the desert coolers usually operate at high load factor. Revenue from the cooler is about $1.50 to $2.50 per month per unit. The average cost of a factory job is in the neighborhood of $75, thus placing the cooler within range of a far greater percentage of population than the more expensive complete air conditioning. In fact many homes now have several of the units. Office buildings, schools, small shops, stores, and even movie theaters have used the desert cooler to bring heat relief.

In Brawley, Calif., a Mexican theater had a big shed constructed at the rear of the stage. Its walls were pads of water soaked excelsior, and a big blower drew air through these cooling filter pads and blew it into the theater.

Where the wet bulb temperatures are high, as they are in Imperial Valley, the desert cooler is not so effective as in more arid climates such as Tucson. Yet even where the outside temperature, dry bulb, is 110 deg. F. and the wet bulb temperature is 80 deg. F. it is still possible to bring air in to a room at about 85 to 90 deg. and provide a relative relief from the heat. This would indicate that the possible field in which desert coolers could be sold might well be extended to almost all parts of the West, particularly to the interior. Along the coast this type of cooling is seldom necessary. The excelsior pads also make an excellent filter to exclude the dust and sand laden air swept across many hot desert valleys of the West.

San Joaquin Light & Power is launching a desert cooler campaign for the first time this year. Now that neat and more efficient factory jobs are available for easy installation, the market for the desert cooler should expand this year throughout the West. In eastern Washington and Oregon, in Idaho and Nevada, in Utah and Wyoming, the desert cooler can be sold to bring relief from excessive summer temperatures. In none of these regions is the relative humidity too high.



A neat factory made evaporative cooler with one side panel removed. This unit uses a special Wagner evaporative cooling fan assembly and an auxiliary water circulating pump also developed by Wagner for such coolers

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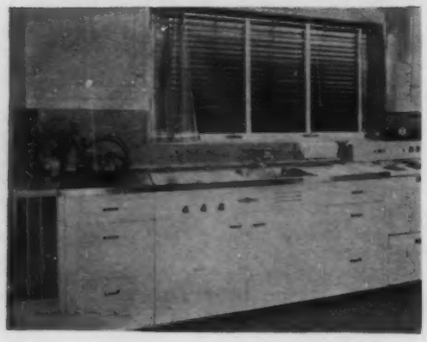

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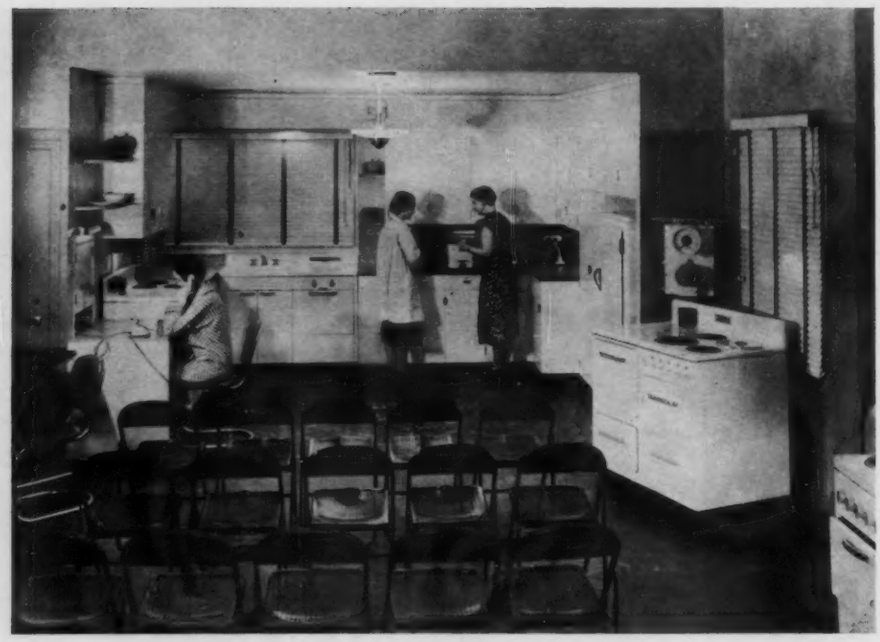

It's Done With Kitchens

Instead of large cooking schools, Portland General Electric Co. does a more intimate and sales producing job by holding cooking classes for its salesmen's prospects. Beth Fillmore, home economist, puts on a standard cooking demonstration which contrasts the economy of electric cooking in actual cost of materials and energy used with the retail price of the same product bought from a store. From the first series of classes the salesmen closed 62 per cent of the prospects who took the cooking instruction. Miss Fillmore emphasizes the need to keep the program simple, to standardize the procedure even though it may tend to become "old stuff" to those giving the classes, and to keep the salesmen interested in bringing prospects to the schools for instruction. The kitchen, shown in the picture at the top of the page, is used also to hold salesmen's cooking classes—which strengthen their salesmanship—and to hold classes for range owners, explaining the ways to get the most from their range, refrigerator, etc. Each of a list of 10 advantages of electric cooking is given visual performance proof during the two-hour cooking class. As each point is proved, the prospect is asked if she agrees with the conclusion

1. Besides its display kitchens on the main lobby floor, and an electric kitchen background for its stage in the cooking school auditorium, Washington Water Power Co. has this laboratory kitchen where its home economists test out recipes, prepare materials needed for the cooking classes, cook on dealers' ranges so as to familiarize themselves with them and thus give more effective demonstrations, and for preparation of meals for large groups often invited to the company auditorium

2. Howard Stopler, one of Burbank, Calif.'s pioneer electrical contractor-dealers, has made the most of present day interest in electric kitchens. This complete Hotpoint kitchen occupies one side of his recently remodeled store on San Fernando Blvd. Mr. Stolper takes pride in an all electric apartment house, electrically heated and with electric kitchens in every apartment, which he wired for Seegar, the cartoonist creater of "Popeye", across the street from the Warner Bros. studios in Hollywood

3. While more publicity has come to the electric kitchens of a single manufacturer's product here is one in which several makes collaborate under the name, "Electrocraft". Standard electric ranges, Elgin cabinets, Conover dishwasher, and a refrigerator of any make. This display kitchen is used by the group in Los Angeles

4. Most convincing demonstration a dealer can make is to bring his prospect to see the spic and span kitchen he has in his own home, explaining that his wife finds it easy to keep it presentable always, no matter when he brings some one in to see it, because its electrical servants help to keep it clean and orderly. The Better Housing Bureau in Spokane uses this home kitchen in just such a way

5. A novel idea is found in this kitchen. A narrow space at the end of the standard cabinet space on the work area is used to make a rack for serving trays. Suggestions from a dealer of such little details of convenience make a hit with a prospect because they show that a real interest is being taken in making the "dream kitchen" a thoughtfully planned one

On the page opposite is the clever electric kitchen worked into a corner of the store by Grabe Electric Co., of Tucson, Ariz. Besides its everyday use as a place to which the prospect may be taken, seated comfortably and clearly shown the advantages of any of the appliances in actual operation, it can be used as a stage for store cooking school and receptions. When a wife brings her husband in with her for a demonstration this live dealer makes them a present of a lamp or small appliance he would otherwise have to sacrifice to clear stock

ELECTRICAL WEST

Appliance Sales Guide

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MODERNIZE ELECTRIFY YOUR KITCHEN

for

More Satisfaction Sell Electric Kitchens

"Key Plan used with success

Kitchens may be sold as a complete unit, or piecemeal, one appliance at a time, as the occasion warrants. But with F.H.A. financing and extra sales effort more prospects can be sold the entire job. It takes more organization of the various elements involved in a kitchen—the painters, plumbers, electricians, cabinet makers, etc. But the reward is worth it in both gross sales and in personal satisfaction.

By constant contact and work with the architects and home builders a dealer in Piedmont, Calif. (Gray Minor) now has them calling for him and turning over the kitchen design to him. Even where he sells a remodeled kitchen he carries on the preliminary negotiations in selection of color scheme, equipment, etc. Then he asks for the key to the kitchen and suggests that the prospect go on a vacation or trip. On the specified date for completion he turns over the keys to the owner and lets her enter the completed kitchen, finished in every detail. This he calls a "key plan". This dealer finds the thrill of selling so keen that he hires floor salesmen to keep the store while he devotes practically his entire time himself in the field selling.

"Dated Kitchens"

In the use of contrasting "before and after" pictures of kitchens that have been remodeled, one very successful kitchen sales organization in Fresno uses the slogan, "Is your Kitchen Dated?" Pictures were selected that showed definite periods in kitchen plan and arrangement and contrasted these with modern planned kitchens.

Another and a clever idea for demonstrating the advantages of an electric kitchen from the same place is that of two display boards. On one objects representative of the things eliminated from a kitchen by modernization are mounted. On the other are hooks or racks on which to hang or attach objects representing the things gained by an electric kitchen. In making the presentation the salesman discusses the disadvantages of the old time kitchen, and eliminates one thing at a time from the board. Then as he speaks of the advantages he puts up objects that represent these. In this visual manner the gain to be made by a new kitchen is dramatized and it registers more vividly with the prospect.

To overcome doubts as to the dishwasher another idea worth using is that of sending an invitation to selected prospects to bring in a day's dirty dishes for washing, inviting friends along for the demonstration. This offer and demonstration never fails to convince a whole circle of acquaintances.

TO the salesman or dealer who wants to go after "big game," the electric kitchen offers a real opportunity to exercise versatile talents. Each complete sale is a real achievement and brings a satisfaction not to be found in the sale of any of the individual appliances that go into the kitchen. For real zest it has no equal.

Compared to the cost of a car, a kitchen represents a total sales price of about $1,200. This is distributed about as follows: Range $325, refrigerator $250, dishwasher $170, fan $15, water heater $125, mixer $25; linoleum for floor and work surface $75, cabinets and hardware $125, plumbing $50, paint and wallpaper $50. Financing for the complete kitchen (excepting the mixer) can be arranged through a F.H.A. loan and paid off as with the purchase of a car.

Remember that a new car offers *escape* from home; a kitchen offers a way to make home attractive, to make desire to escape unnecessary. A car offers a certain prestige and pride; a modern kitchen offers just as much prestige and it lasts longer. Besides, an attractive kitchen becomes a family social center as it used to be in the old days. It serves to keep the children at home, to make the home their center of activity.

Newest kitchen designs embody this idea. They provide a sitting room area, a place where informal meals are had, sewing and mending done, an informal visit conducted while a meal is cooking. Gather such ideas into a scrap book or two, loan these to prospects and let them sell themselves as they visualize how they will use the ideas that appeal to them.

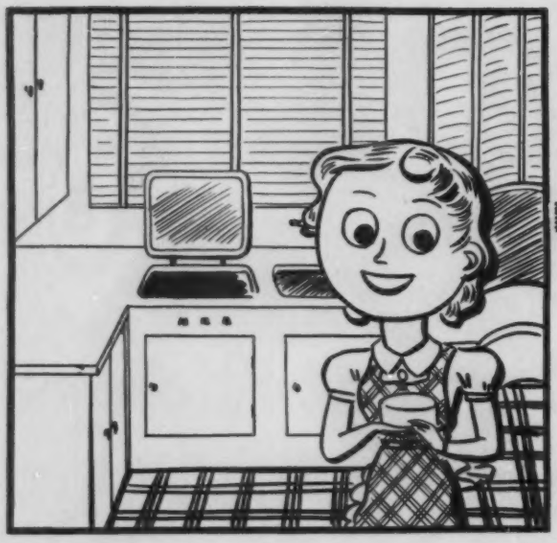
What a Sales Appeal!

Do you want the sales appeal of an electric kitchen boiled down for you into one paragraph? Here it is:

"You can have a kitchen that will be a real center of your home activities, one you'll be proud to bring your friends into. A kitchen nowadays has become almost as important a social gathering place as the living room, don't you think? Such a kitchen will save you needless steps, and hence your feet and back will be relieved of the strain of so much standing and walking. In summer it will always be cool and attractive—a real joy to work in. In winter it will be cosy and sociable. The care of it will be reduced to a minimum—no soot or smoke, everything clean and shiny. You'll need less outside help, if any at all, and that's always a relief. It will contribute to your family's health and, more important, its happiness, for the family, not the kitchen, can have more of *you*, at your best, too, both in looks and in good humor. You will feel more like eating your own delicious cooking. What a lot of pride you will take in its being the last word in modernity, and in the fine reputation as a cook and hostess it will bring you among your friends and family."

July 1938

Electric Kitchens



. . . When the

If she says, "I'd love to have one, but—"

the chances are, you will find upon diplomatic questioning, that she

1. **Thinks it would cost too much.**
2. **Fears the house would be torn up too long.**
3. **Already has an electric range, refrigerator.**
4. **Does not think she wants a dishwasher.**

Or it may be some other feature she does not think she wants. Questioning her diplomatically will bring out the objections to a particular appliance or feature. With the dishwasher, for instance it is apt to be because she thinks

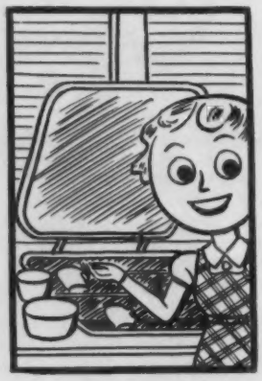
1. **It is too expensive.**
2. **It is not practical.**
3. **It is an extravagance.**
4. **"Dishwashing never hurt anyone".**
5. **"How about pots and pans?"**
6. **"Will it really wash clean?"**

Once you isolate the objection, it is easier to apply to it the particular points of advantage that will outweigh or eliminate that objection. In selling the electric kitchen, judgment must be used to decide just how much of a kitchen can be sold in the original order, how much it will be wise to defer until the first units are paid for. To leave the door open through which to come back later and sell equipment to complete the electric kitchen it is important that the overall advantages of the complete electric kitchen be told in any case. Then the initial effort can be directed to remove all obstacles to the purchase of the basic units, range, refrigerator, water heater and lighting. Refresh your mind with the **advantages** of the all-electric kitchen, the dishwasher, garbage disposal unit, fan, radio, mixer, lighting and wiring and use these to sell the full enjoyment of a complete kitchen.

Ask QUESTIONS to isolate the objections
Tell ADVANTAGES to overcome them

Kitchen

Investment about that of a new car but it will serve the family longer.
Financing can be arranged on long F.H.A. modernizing loan.
Economies possible in food savings and preparation will help pay for it.
Less upkeep, less painting and cleaning costs.
Servants seldom needed to prepare meals or to clean house.
Eventual pleasure well worth the temporary inconvenience while the remodeling is done. It won't be needed again for a long time.
Attractive, cheerful work place.
Admiration of friends and neighbors and pride in ownership of so modern, up-to-date a kitchen.
Remain fresh, youthful, attractive because of the steps and standing you save.
Family health will be better for the tasty foods, the vitamins and mineral juices saved, as well as the attractive surroundings.
Promotes family pride and a desire to spend more time at home.
A social center, the kitchen was in pioneer days, and now can be again in a kitchen you take pride in asking friends to enter.
More appetite for your own cooking.
More time to yourself, to your family, husband and children; less time necessary in kitchen.
Comfort, because no waste heat escapes to make summer cooking difficult.
A snack room for informal entertaining.
A better hostess, for you can spend more time with your guests.
Harmony of color and decoration promotes better dispositions.
Fresher air, for cooking odors and fumes are eliminated or drawn away.
Planned to save steps and effort by an arrangement of centers for storage of foods, preparation of them, cooking, and serving, and for cleaning up after the meal. Designed to conserve time and energy.
Enhanced value of the home equipped with an electric kitchen in case sale of the property is necessary.
Stays modern longer, for the kitchen will not soon be outmoded. It is truly "tomorrow's kitchen."



Dishwasher

Savings overcome the cost in the long run and pay back many fold.
Easier on dishes and saves breakage of expensive china.
Linens and laundry of dishtowels saved.
Kitchen help not needed, a saving too.
Health savings result from cleaner, more sanitary dishes.
Carrying of colds and infections is prevented because dishes are washed and rinsed in water hotter than hands can stand.
Germ breeding dishrag is eliminated.
Practicability proved by more than ten years of successful operation. Users swear that they would give up any appliance but the dishwasher.
Usefulness precludes extravagance.
Less time needed in the kitchen, more permitted with family. There is no arguing with children over doing dishes. No piles of dishes on return from a trip. When ill or occupied or on vacation the children or husband can do up the dishes quickly and painlessly. It is estimated 39 per cent of the husbands help with the dishes and hate it.

THE MONTANA POWER CO. • IDAHO POWER CO. • UTAH POWER & LIGHT CO.
PUGET SOUND POWER & LIGHT CO. • PACIFIC POWER & LIGHT CO.

Prospect Says: "NO"

NO. 7B
ELECTRIC KITCHENS

Standing on tired feet eliminated. Cooking takes about 19 per cent of a woman's time; dishwashing by hand 13 per cent—unproductive labor.
Pots and pans wash easily in an electric kitchen where foods are cooked under controlled heat. Dishwasher will wash any pots and pans that do not require scraping anyhow. Utensils used in preparing the meal are washed while meal cooks.
Elaborate meals are no longer looked upon with dread. Meals taste better to the cook when she does not have to look forward to piles of dishes.

Disposal Unit

Most disagreeable problem solved. Disposes of food wastes as fast as they are made, before they have a chance to putrify.
No greasy litter to be cleaned out of the sink. Waste material reduced to a thin, harmless pulp. Bones, fruit pits, corn cobs, peelings, rinds, leaves and roots all washed out with the sewage.
Wrapping or separation unnecessary.
Garbage can cannot be kept sanitary but this unit can. There is no place for germs or molds to collect or grow. Cleaned automatically by flushing water through it.
Sweet smelling kitchen always. Onions or cantelopes do not remain to generate odors awaiting the garbage man.
No going outdoors in cold weather to dispose of garbage. Without leaving the sink food preparation or plate scrapings go into the unit and disappear.
Stray cats or dogs cannot overturn the garbage can and spread refuse.
Only non-putrifying rubbish like cans, bottles, papers needs to be carted off. Less frequent service needed—a saving in expense.
Ants, flies, roaches or other vermin are discouraged. There is nothing to attract them.
Pride in being in advance of the times with the newest kitchen convenience.

Ventilating Fan

A clean smelling kitchen and house because cooking odors, steam, and smoke are drawn out immediately. A change of air keeps the house free from that old fashioned, "middle class smell" of cooking odors so common to the Gay Nineties.
Cleaner curtains and walls for the grease laden fumes are drawn straight out without allowing opportunity to deposit on drapes or walls.

Fresh air without insects. The fresh air is drawn in by forcing the stale air out. New air seeps in and flies and insects are unable to enter.
Maintains vitality because of the change of air and coolness of the kitchen.

Kitchen Mixer

Keeps hands free of fruit stains, cuts, scrapes in the preparing of foods.
Does the tiresome beating and stirring that task even strong arms and hands.
Saves time in mixing up cakes, biscuits, shredding or peeling vegetables, or juicing oranges.
Assures a repetition of good results. Every cake can be a success with accurately measured quantities. Texture is smoother.
Saves money on prepared foods by making mayonnaise, spiced to just your own taste, at home. Other savings possible in cookies, cakes, soup stocks from meat and vegetable trimmings.
Improves appearance of salads served by cutting vegetables precisely and daintily.
More sanitary than preparing foods by hand.
Makes you independent of the servant problem by taking the labor out of food preparation.
Easy to clean and use. Modern mixers are designed for quick rinsing.
Makes the kitchen modern, attractive in appearance and the envy of the less well equipped.
Is so versatile. With the accessories a great variety of tasks can be accomplished quickly and easily.

Radio

Good company while you are home and busy in the kitchen. No need to miss favorite programs or news even though away from the living room.
Home economics programs furnish recipes and household hints that you will want to receive

and perhaps write down in your kitchen file.
Music for the informal snack party in the kitchen.

Range

(See Sales Guides for Mar. 1938, also Feb. 1937, Mar. 1936.)

Water Heater

(See Sales Guide for May 1938, also Mar. 1937, May 1936.)

Refrigerator

(See Sales Guides for April 1938, 1937, and 1936.)

Lighting

Center fixture—Dresses up the room. Can be had in a variety of finishes to harmonize with the trim.
No standing in your own light for illumination is diffused throughout the entire room. Can see what you are doing so much better.
Over the sink—More light where you need it most. Makes it easier to select berries or vegetables, removed spoiled spots; wash dishes cleaner.
Under the cupboards—Like a desk lamp, more light is concentrated on the details of your work and speeds.up your seeing

Wiring

Convenience in the use of your kitchen without the bother of hunting for cords, places to plug them in, or groping around for light switches requires adequate wiring—**comfort wiring.** With it will also come the by-products —**safety** at all times, and **your full money's worth** for your electrical dollar; in other words your appliances and lamps will deliver full efficiency. Suggestions for kitchen wiring conveniences include:
Switches with night lights at door entrances.
Pilot lights on appliance outlets.
Plug-in strip along the cupboards at the working spaces.
Plug-in strip or outlets in the breakfast or dinette nook.
A multibreaker panel to protect all kitchen circuits.

ROCKY MOUNTAIN ELECTRICAL LEAGUE • PORTLAND GENERAL ELECTRIC CO.
CALIFORNIA OREGON POWER CO. • WASHINGTON WATER POWER CO.

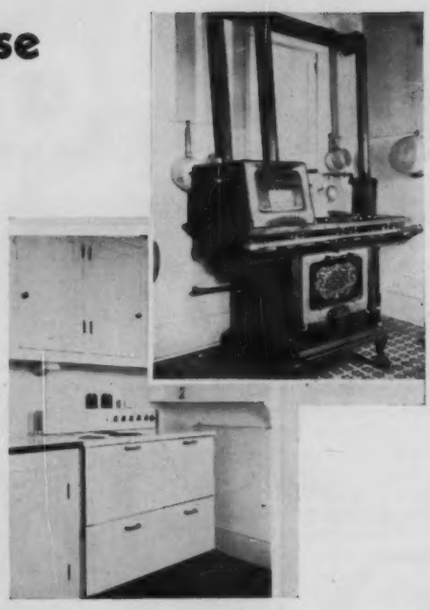
How a Dealer Can Promote, Advertise and Sell Electric Kitchens

Asked how he sold electric kitchens so successfully, a dealer in Piedmont, Calif., who has been outstanding in kitchen sales answered simply, "Why, I just do the things and use the materials that the electrical magazines and the manufacturers and the national campaigns recommend." The secret of his success is no secret, but exactly what the entire industry advises doing. In his case the actual *doing* and *using* of the recommended things is accomplishing what can be done by any progressive dealer.

On this page are a number of easily done, inexpensive, and very effective aids that any dealer can use profitably. Most of these materials may be obtained from the Modern Kitchen Bureau, 420 Lexington Ave., New York City, if there is no local bureau in your vicinity.

Job Posters—

On new homes sold an electric kitchen take advantage of the flock of home seekers who visit it during construction and display by labeling the job with a poster like that below. It calls attention to the kitchen and gets you your full advertising value.

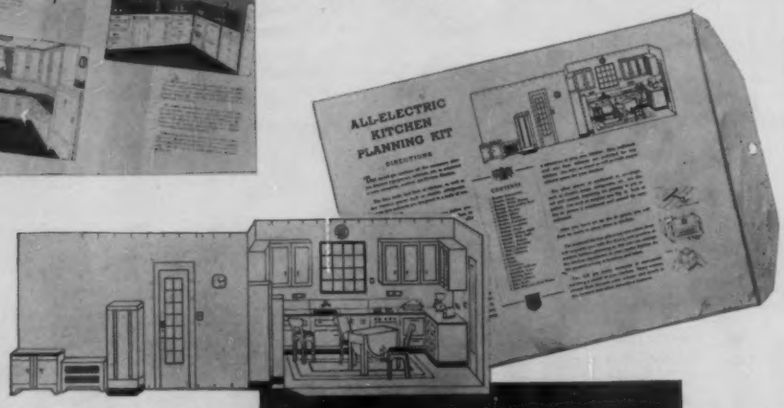


Contrast Pictures—

"Before and after" photographs help your prospect to visualize what can be done with her own kitchen. Often, too, they show that a kitchen, considered rather good only a few years back, has been transformed into a more efficient working place, saving steps and cleaning. Pictures also suggest little details of decoration or convenience that appeal. Use your own pictures if you can, or the Modern Kitchen Bureau can supply you with a wide collection of them.

Mailing Pieces—

Besides the mailing pieces available from the makers of your lines of appliances there are available from the Modern Kitchen Bureau at low cost a wide variety of excellent envelope stuffers, booklets, self mailing folders—also newspaper mats and cuts.



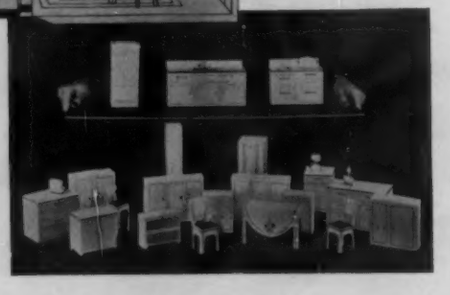
Women's Magazines—

Be on the watch for pictures and stories in the women's magazines such as McCalls, Ladies Home Journal, etc. Use these in a manual or on window cards. Show them to a prospect. One excellent idea is to make up "Kitchen Idea Scrap Books" that you can loan.

Letters of Your Own—

To former customers who have bought a refrigerator, washing machine or other appliance from you, address friendly letters in which you remind them of the benefits they will derive from a complete electric kitchen. Use freely the list of such *advantages of ownership and use* contained on the inside two pages. Just as an example, here is an easy letter to write, but it is filled with sales suggestions:

"Dear Mrs. ———: Since your refrigerator came into your kitchen, have you thought how you would enjoy a complete electric kitchen to go with it? Perhaps you have dismissed the idea feeling *it would cost too much* or that *the house would be torn up too long.* Yet, surprising at it may seem, the cost would be *only about that of a new car* and think how *much longer it would serve the family* in every day use. As for the temporary inconvenience, the *eventual pleasure* from such a kitchen should be well worth it. Why not let me bring over full information of the F.H.A. etc."

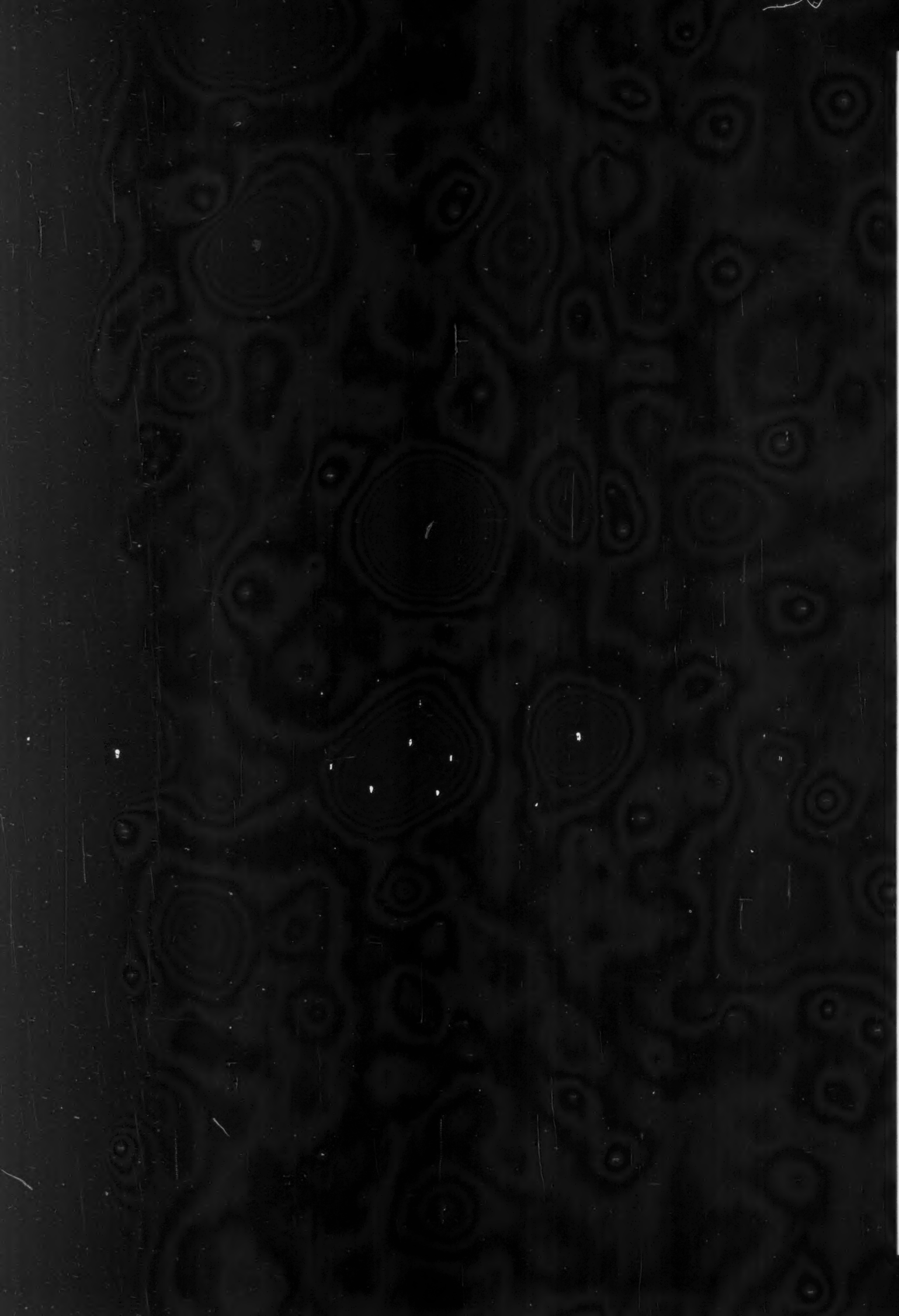


Kitchen Kits—

For 5 cents each, kitchen kits can be had from the Modern Kitchen Bureau to give to prospects. Made of cardboard, perforated and easy to assemble, the prospect can arrange and rearrange the kitchen in miniature until a satisfying combination is achieved. There is no more effective way to create a want for an electric kitchen than this.

Emblems, Window Signs, Counter Cards, etc.—

Repetition of an idea, constant suggestion through repetition—that is the fundamental basis of all advertising. To make the most out of the current national publicity on modern electric kitchens, you will do well to identify yourself and store with it by displaying the emblem, shown below, at every opportunity. Your own show card artist can be instructed to put the emblem on all your display cards. You can obtain inexpensive cuts to use in printing your letterheads, circulars, etc. Counter cards, car cards, store emblems, even window display backgrounds are available for a tie-in with the kitchen idea. Your local utility has a copy of the plan book that illustrates all this available material. It may even have quantities of the materials available that you can put to use immediately. If there is a local bureau, join it.



Ferreting Job

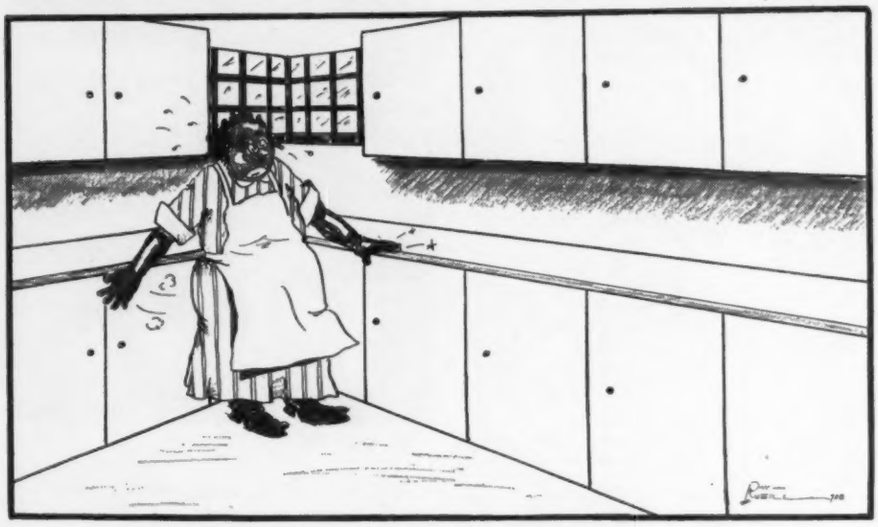
Words of cheer and advice re the San Diego Bureau's fair

Summarizing the results of the San Diego Bureau of Radio & Electrical Appliances' second annual spring fair, Clark Chamberlain, bureau secretary-manager, last month took occasion to speak some words for the benefit of local — and county-wide — appliance dealers.

Said he, after pointing proudly to the new spring fair attendance record of 78,000 visitors and to the inclusion in the fair of more and better exhibits: "Perhaps the greatest surprise in connection with the show was the enormous buying response of our visitors. While some sales were expected, it is doubtful whether any exhibitor anticipated a buying reaction that in many instances exceeded all previous records. The confidential reports of most exhibitors are positively amazing in this respect.

"As everyone knows, appliance sales generally speaking have been under the figures of last year. Actually, throughout the county, sales volume has been far above what one would think possible, considering the amount of gloom. . . . Possibly too much attention has been paid to "conditions" and not enough to ferreting out those who are able and willing to buy. Certainly the spring fair proved that just as much interest as ever before, probably even more, exists for the things we have for sale."

LOST, STRAYED OR STOLEN —by Russell



"It all looks right purty, but Ah decleah Ah cain't find de stove"

APPLIANCE SALES REPORT

A Summary of Dealer and Utility Reports Compiled by Associations, Societies, Bureaus, or Dealer Contact Departments of Utilities

MAY, 1938

REPORTING COMPANIES	Idaho Power Co.[1]		L. A. Bureau of P. & Lt.[2]		Montana Power Co.[3]		P. G. & E. Co.[4]		San Diego Cons. G. & E. Corp.[5]		San Joaquin Lt. & P. Corp.[6]		Southern Calif. Edison Co. Ltd.[7]		Utah Power & Lt. Co.[8]		Wash. Water Power Co.[9]	
	Current	5 Mos.	Current	5 Mos.	Current	5 Mos.	*Current	4 Mos.	‡Current	5 Mos.	Current	5 Mos.	Current	5 Mos.	‡Current	5 Mos.	‡Current	5 Mos.
Ranges	461	1555	436	1940	107	228	347	1001			133	588	289	1359				
Water Heaters	320	726	124	809	15	70	186	601			63	280	110	512				
Air Heaters, aux.	3	169	7	442			202	2376			4	118	32	704				
Air Heaters, 220			93	236	4	39	81	266			41	187						
Refrigerators	674	1867	3202	11611	797	2278	4923	11198			896	2518	3913	13537				
Dishwashers	4	7	8	63			16	46			1	34						
Washers	303	1628	1715	7719	466	1978	2581	8410			295	1351	2143	9640				
Ironers	24	180	352	1455	41	221	436	1466			41	226	279	1346				
Vacuum Cleaners	77	451	470	2454	235	1177	2011	7574			83	493	736	4260				
Radios	359	3078	2326	12392	516	3064	7630	32190			375	2595	3605	20182				
Mixers	50	234	154	736			279	1097			59	199	279	1209				
Cookers, Casseroles	16	70	51	342							95	199	58	317				
Irons	340	1695	505	2727							386	1415	962	4708				
Waffle Irons	63	520	162	1018							80	392	311	1616				
Toasters	111	725									148	631	441	2364				
Table Stoves	161	491	109	800	721	4095					114	419	216	1207				
Heating Pads	27	247	50	727							24	209	96	974				
Curling Irons													41	203				
Coffee Makers	121	758	64	263							108	546	271	1472				
Sewing Machines	9	48					526	2266										
Clocks	78	406	159	902							126	755	462	2573				
Fans	39	71	166	333							271	297	193	393				
Floor Polishers																		
Sun Lamps	3	47	19	122									21	140				
Reflector Lamps	214	1077									143	583						
Miscellaneous Lamps	176	1294			650	3062					95	605						
Yard Lights											80	219						
Misc. Small Appl.			302	1304							154	583	586	3064				

SOURCES

[1] Figures compiled by Electric Equipment Sales Association. Include power company sales of all reporting dealers—about 60%

[2] Compiled by Los Angeles Bureau of Power and Light for territory served by that system.

[3] Combined dealer and company sales from report of Montana Power Co.

† Does not include dealer figures for two divisions for January and February, 1938.

[4] P. G. & E. reports sales of major appliances only based on accurate reports from dealers' accounts. Ranges, water heaters and air heaters include company and dealer sales. *Due to delays in compiling report current and total figures are always one month behind those figures of companies reported in other columns of this table.

[5] Gathered by Bureau of Radio and Electric Appliances of San Diego County. Estimated monthly sales figures used in this table: Miscellaneous figures includes fans, curling irons and sun lamps.

[6] Includes dealer reports from Midland Counties Public Service Corporation also. Compiled by Valley Electrical Supply Company.

[7] Includes reports from dealers on San Joaqin Valley system of company as well as Southern California areas served.

[8] Includes Utah Power & Light Company territory in Utah, Idaho and Wyoming. Also Western Colorado Power Company territory.

[9] Dealer sales only for Spokane and company territory. Company sales not included. Table stoves, grills included with cookers.

‡ May figures were not available at time of going to press.

Selling Goodwill

Planting trees begets public favor for California Electric Works

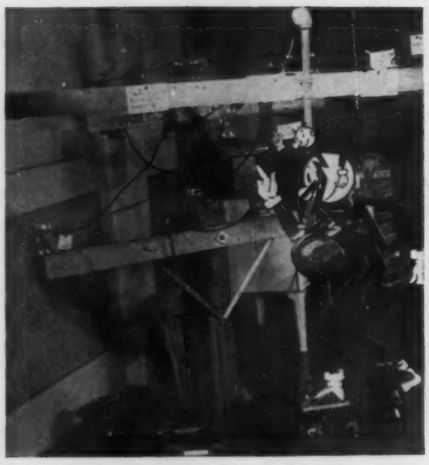
It may be a far cry from the motor repair business to the planting of trees along a state highway, but believe it or not, that is just what the California Electric Works personnel, every man of them, do each year. The reason for doing it is just as unusual as the act itself. Primarily it is done as a matter of civic pride and the development of civic responsibility—a personal improvement idea. Only incidentally has there been any thought of public goodwill as a result of this planting, for few people are told about it.

The idea originated three years ago among some one of the employees or members of this unusual electrical firm, whose principal business is electrical motor repair, electrical installation and commercial and industrial electrical equipment. Picnics and fishing tips are frequent weekend diversions for this organization. But to give purpose to a trip into the country, and a responsibility to return regularly, the idea of asking the State Highway Department for permission to plant trees along one of the main highways was conceived. The highway division was flabbergasted at any such volunteer request. There was considerable red tape to be cut. Maps had to be drawn, locations spotted, trees selected with care, and then a guarantee made that the planted trees would be maintained for at least two years.

All of these conditions were met, and for three successive years on scheduled week ends, each member of the organization spends a few hours planting, pruning, cultivating, watering, or otherwise caring for certain trees. The trees are usually located in groups at intersections or along roads needing shade or wind protection.

This civic contribution, while chiefly benefiting those who participate in it by developing their own civic pride, nevertheless has reflected in goodwill on the part of the community, the highway department, and all who hear of it by word of mouth.

More consciously goodwill building are a score of other novel ideas of promotion and personalized service in which this company specializes. One of the most recent is that of inaugurating snappy uniforms for its men, blue for repairmen and tan for wiremen, with the firm name stitched on the shirt in an emblem, and the man's nickname on his pocket. Unusual calendars, spectacular Christmas cards (last year it was a single sheet bill poster on which



Puget Sound display

were printed in huge letters "Here's wishing you a great big MERRY XMAS") and a hundred little thoughtful services and personal attentions, have made the firm outstanding and brought it a continuing stream of steady business good times and bad.

Puget Sound P. & L. educates its employees—successfully . . .

Employees' educational meetings are nothing new. Nor are they always successful. But Puget Sound Power & Light Co. has scored 100 per cent grades in both categories. The reason: The educational meetings were developed and are run by the employees themselves. Successfully.

Educational meetings are generally "twilight activities" — activities which can better be carried on by employee cooperation than by company departments. Because this is so, when the plan was first organized the division manager appointed a personal development chairman who was presumably an employee meeting the general approval of his fellow employees.

This chairman then selected subchairmen, approved by the division manager, to head activities he outlined. From that point the chairman acted in an advisory capacity to the sub-chairmen, who have the privilege of selecting any persons they wish to form their respective committees.

Inasmuch as committee members are representative of all departments, the burden of accomplishment is placed on a broad base assuring wide participation. The whole arrangement assures that the activities will be conducted in a democratic manner. And it offers excellent opportunities for the individual.

Most impressive course undertaken under the plan is entitled "Know Your Company," purpose of which is to give information about the various departments. Department heads are spokesmen, but committee members responsible for each meeting assist in compiling data and in the preparation of the head's talk. All talks are mimeographed and made available to employees attending. These mimeographed copies constitute a handbook written with attention to broad details.

Each monthly meeting is so arranged that department heads and their supervisors appear. The result is a complete digest of each department's activities.

To give each employee an opportunity to help, the setup is such that on an average, fifteen employees collaborate in putting on one meeting.

Over-all results of the plan have been appreciation by the employees for the information given, whole-hearted cooperation between employees and management.

. . . and does something for the public as well

Proof that if you tell the public something about a subject of which they know nothing you will get a favorable, eager response was a window display set up in Puget Sound Power & Light Co.'s Winslow, Wash., office. So favorable, in fact, was the response of Winslow residents to the utility's correct service setup that company employees were kept busy answering questions about the work, costs, the scope of line extensions, etc.

The display (see cut) consisted of an 8-ft. stub pole anchored to the wall with the proper guy wires. Brought to the top cross-arm of the pole were "2,300"-volt primary wires. A 1½-kv. transformer was hung and the primary taps connected to the "220"-volt secondary wires. Service wires were taken off from the secondary at a point directly inside the show window, where the service was brought to a weather-proof head capping a conduit connected to a socket type meter.

Placards indicated the size, description and cost of such items as transformers and bare copper wire. Voltages were also indicated.

Edison Co. starts a suggestion contest among employees

Suggestion contest has been inaugurated by Southern California Edison Co. to stimulate employee interest in activities which will advance company-wide economies. Cash prizes in the contest, which will end Dec. 15, will be awarded in two groups, one including officers, department heads and division and district managers and superintendents, the other including all other employees. First prize will be $200; second, $125, and seven additional prizes, $10 each.

The contest ties in with the distribution of periodical issues of the "Bonus Barometer," a chart showing the progress of the company's earnings and their relation to the company's ability to pay a bonus at the end of the year. Considered for contest prizes will be any suggestions which will result in operating economy, etc.

The sportsman is helped by a Utah P. & L. plant super

C. G. Stanton, superintendent of the Utah Power & Light Co. plant on the Bear River in Idaho, gets credit for creating goodwill of sportsmen for the company. Under his direction a private rearing pond, capable of holding 80,000 rainbow trout, has been constructed near the plant.

The trout are fed at night by the simple but effective method of electric lights, strung across the pond. Switched on after darkness has fallen, the lights attract bugs which attract the fish.

So abundant is the food that the fish are soon of legal size. They are then hauled to a near-by stream and released for fishermen to catch.

●

List Price

Portland utilities stabilize water heater market

Signaling a 10 to 15 per cent rise in the retail price, Portland General Electric Co. and Northwestern Electric Co. last month started selling automatic electric water heaters at manufacturers' suggested list prices. The move was designed to encourage appliance dealers and plumbers to promote the sale of water heaters inasmuch as they will now receive the customary merchandising profit.

At the same time both companies agreed that on normal jobs they would install water heaters, sold by any dealer at the fixed price, for $14.50 for wiring and $7 for plumbing and would carry this $21.50 on a time contract with the purchaser at $1 down, $1 per month. In both cases the companies contract the wiring installation to established electrical contractors but do their own plumbing.

Prior to the adoption of the policy the electric water heater was the only electrical appliance sold in the Portland area at less than list price. Since adoption, many appliance dealers formerly handling water heaters but without enthusiasm have inaugurated aggressive promotion activities. Further, some 15 to 25 plumbing firms have signified their intentions to enter the field.

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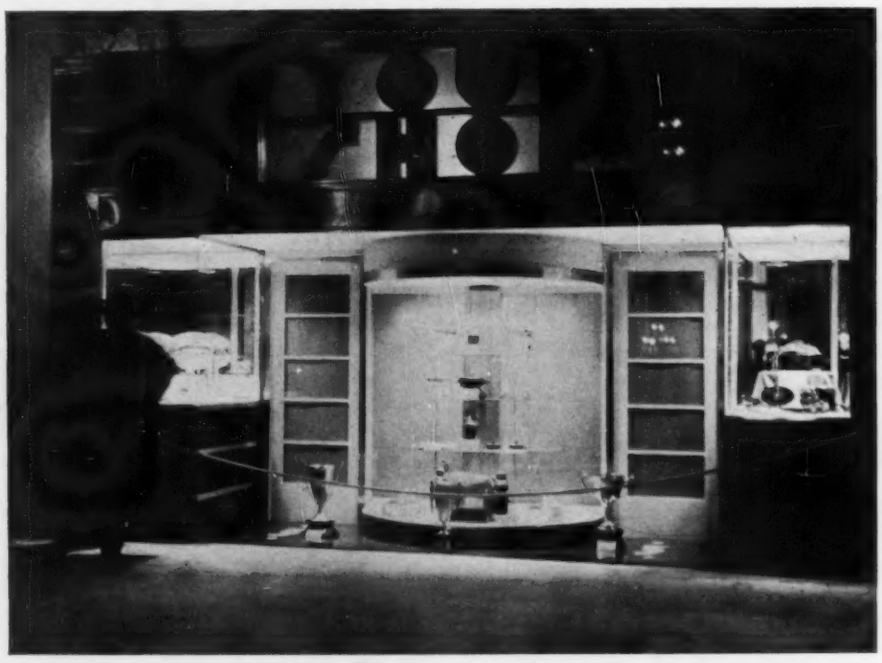
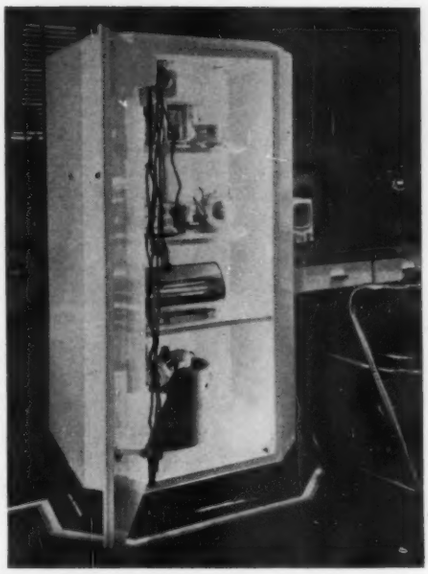
Cavalcades

More news about the movement to dress up San Francisco

Into its sixth month goes Pacific Gas and Electric Co., San Francisco division's "Cavalcades Are Coming in 1939" promotion. Already salesmen have taken the story of dressing up and lighting up for the Golden Gate International Exposition to 5,570 of the company's 27,000 commercial lighting accounts. Live prospects developed out of these contacts total 1,257; contracts for immediate remodeling business, 607. And still the barrage of promotion letters continues.



P. G. & E. exhibits its model store front at the PCEA convention



A time and step saver is this appliance storage cabinet developed by H. C. Bender of Washington Water Power Co. and first installed in the company's model kitchen. The 4½x2½x2½-ft. cabinet is finished outside in white, inside in peach. Interior illumination is provided by three 40-watt lumiline lamps in vertical position. Bottom shelf is stationary. Two upper shelves are round (2 ft. in diameter) and are mounted in turn table fashion in order to make appliances easily accessible. Clearance between these shelves is 1 ft. Appliance connecting cords hang from a bar on the inside of the door and are clipped tight at the bottom

To illustrate what a modern store front can be, P. G. & E., the Electrical Contractors' Assn. of San Francisco, Cabinet Manufacturers' Institute of Northern California, Pittsburgh Plate Glass Co., Pittsburgh-Corning Co., Kawneer Co. and Color Blend Co. have cooperated in making a portable model store front (see cut) which is displayed at fairs, shows and in the power company windows. Merchandise shown in the model store's windows is in keeping with the themes of the various shows—drugs at a drug store, etc.

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Future Campaigns

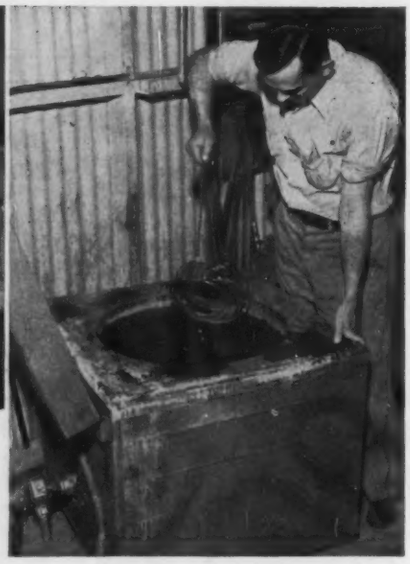
What is being done to boost dealer-utility appliance sales

Following utility-dealer campaigns have been scheduled in the eleven Western states for the next few months:

B. C. Electric Railway Co.—During July, an active selling drive on summer cooking appliances, such as hotplates, rangettes, cookers, etc. Special events for August call for a display at the Vancouver Exhibition.

Central Arizona Light & Power Co.—July and August, campaign on air conditioning and air cooling equipment. This will be backed up by company advertising and dealer advertising.

City of Seattle—During July and August the



Left—Electrical spot-welding of accessory parts at Troendly & Plummer plant. Center—Sawdust box used for drying metal parts after rinsing. Sawdust kept moisture-free by electric heater shown. Right—Rinsing electro-plated parts in electrically heated tank

department will feature an electric range and refrigerator on a combination deal, and automatic electric water heaters at an installed price. Two models of ranges with wiring will be sold at an installed price. Special events are two exhibits presenting the modern electric kitchen; radio programs stressing adequate wiring.

Coast Counties Gas & Electric Co.—July and August, campaigns on electric roasters and water heaters.

Los Angeles Bureau of Power & Light—July and August, range campaign.

Pacific Power & Light Co.—July, refrigeration campaign; August, kitchen modernization campaign.

Public Service Co. of Colorado—July and August, IES lamp campaign.

Puget Sound Power & Light Co.—July and August, campaigns on ranges, water heaters and refrigerators. June marked the end of the company's "Span of Life" essay contest sponsored through the cooperation of dealers, jobbers and manufacturers.

San Diego County Bureau of Radio & Electrical Appliances—During July and August the bureau will continue its promotion of refrigerators through a series of newspaper advertisements appearing probably once a week.

Southern California Edison Co.—Inaugurated June 1 and continuing probably through July is a roaster campaign featuring the new Westinghouse "Automeal." Offer with each roaster sold of a free steel table, designed especially for use with the roaster, adds to customer interest. The campaign is backed up by extensive newspaper advertising, occasional radio broadcasts, publicity stories and announcements in "Electrical Times," the company's consumer magazine. Employee interest and cooperation is being stimulated by a bonus for every order submitted. Prior to the campaign a special roaster cooking school for members of the sales staff and home economists was held. Cooking demonstrations are given by these employees before groups of women, women's clubs, etc.

Utah Power & Light Co. and subsidiaries—July, campaigns on commercial cooking and water heating, air conditioning, hotplates and fans, home service lighting. August—campaigns on air conditioning, home service lighting, fans. Special events for the two months include the "Home of Ideas," an all-electric model home, and a traveling restaurant exhibit.

Valley Electrical Supply Co., merchandising division of San Joaquin Light & Power Co.—July, range and roaster campaigns. August, range and laundry equipment campaigns.

Industrial Sales

Electricity comes to the aid of a southern California firm

Troendly & Plummer Wood & Metal Products Co., Culver City, Calif., is typical of many small southern California manufacturing plants which have found electric heat most suitable for processes requiring accurate temperatures. The firm, which manufactures wood and metal accessories for pottery and glass tableware, first tried electric heat a few years ago. So satisfactory was the experiment that it now does five heating operations electrically: spot welding, water rinse bath heating, sawdust drying, oil heating and finish drying.

Of particular interest are the rinse bath and sawdust drying bin. The former is a tank approximately 2 ft. in diameter and 2 ft. deep. It is surrounded by a wooden frame with 3 in. of rockwool insulation and has insulated hinged cover. A 2-kw. immersion heater with thermostatic control keeps the water constantly at the desired 180 deg. F.

When the tank is out of use for long periods at night the hinged cover is lowered, thus reducing losses. The whole structure is mounted on casters so that it can be conveniently moved to any desired location in the shop. Tests indicate an average consumption of about 160 kw.-hr. per month.

The sawdust drying bin consists of a wooden box 3 ft. square and 8 in. deep. The box, which has a metal bottom, rests over an asbestos lined wooden frame. A 750-watt strip heater is supported by porcelain insulators in this compartment. The heat supplied is sufficient to promote evaporation of the water removed by the sawdust from the metal parts being dried; thus the sawdust, instead of being discarded when damp, can be used indefinitely. In addition, the warm sawdust dries the metal more rapidly.

Since the heater is kept on all the time the plant is running, consumption is 126 kw-hr. per month on a schedule of 8 hr. per day, 5 days per week.

Such methods of manufacture have enabled the plant managers to realize low production costs usually associated only with large scale enterprises. As a result, it is not surprising that Southern California Edison Co. industrial specialists (who helped develop the original installations) are called in whenever new heating problems, etc., arise.*

Sales Shorts

Refrigerator market; appliance shows; range sale increase; etc.

WOBBLY STATE of the refrigerator market was indicated last month by newspaper advertisements of bargains and the announced results of the Electric Appliance Society of Northern California's campaign. "Up to $50 trade-in on your old ice box—up to $100 trade-in on electric refrigerators," advertised a Reno store. "We've secured just 100 brand new 1937 refrigerators. We're selling them as we bought them—at bargain prices. Big 5-cubic foot model regularly priced at $179.95 now only $149.95," said a Salt Lake City store. Units sold in the northern California May campaign totaled 5,648 as against 5,914 last year. Prices began to crack after the drive ended. Only in Fresno, Calif., was the local appliance society crowing. Its recent campaign stabilized prices and trade-in offers, prevented a

* Any PCEA member desiring a reprint of one of this industrial power series may be put on the mailing list by filing his request with the chief commercial executive of his company.

dumping of stock, maintained an adequate sales volume.

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SERIES OF DEALER-MONTANA POWER CO. Electric Appliance Expositions were held in Montana in May and June to feature the advantages of electric cookery and to give dealers an opportunity to display their complete line of appliances. Starting with the seventh annual Billings Better Home Show (not strictly devoted to electrical appliances), the utility cooperated in the sponsorship of expositions at Malta, Glasgow, Harlem, Chinook, Havre, Great Falls, Dutton, Choteau and Conrad. Climax was the first annual Butte show at which $2,000 worth of appliances were given away.

●

FIVE PER CENT INCREASE in the number of electric ranges put in service in Portland General Electric Co.'s Portland division during the first four months of 1938 has been attributed largely to the company's policy, inaugurated early this year, of promoting the sale of load-building appliances through established dealers rather than through its own appliance stores. Number of ranges sold during the period totaled 826, as compared with 785 in 1937. Dealers sales exclusively showed a 24 per cent increase.

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AFTER 32 YEARS of appliance merchandising, Grays Harbor Railway & Light Co. has withdrawn from the field. Decision to leave the business entirely in the hands of local merchants was followed by a close-out sale in which items were sold at or below cost. Henceforth the company will stock only a supply of lamp globes.

●

NEW SET OF TRADE CHARACTERS has been introduced to the electrical field by the Bingham Co., sales promotion firm which worked on the National Adequate Wiring job. A copyrighted utility promotion feature, the "Electrakids," as they are called, are depicted spreading sunshine and doing various other home jobs.

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FIRST ANNUAL AIR CONDITIONING, Cooling & Heating Show is being held at the Thremo Air Conditioning Institute, Los Angeles, July 7-10.

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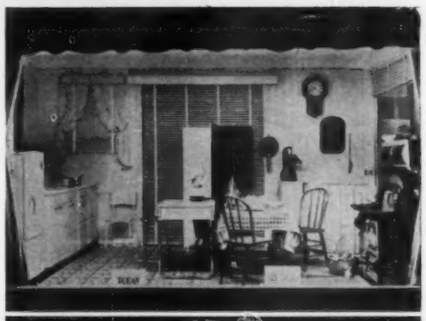
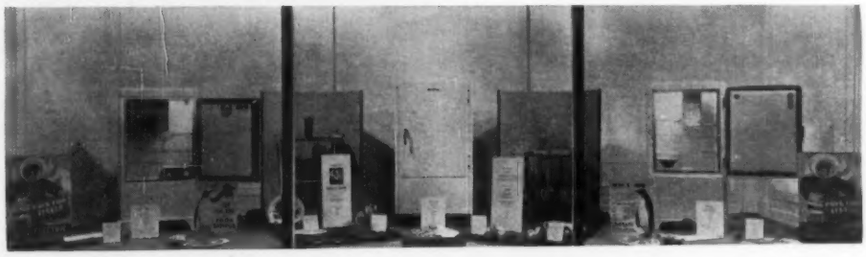
ELECTRIC HOME & FARM AUTHORITY has closed a contract with Public Utility District No. 1 of Cowlitz County, Wash. Contract provides that the authority and district will cooperate in financing the sale of appliances. The authority also closed a contract with Portland General Electric Co. providing for cooperation in the financing of wiring or re-wiring of existing homes and farms on the company's lines.

Window Display Winners in Two Contests

All three winners in the Modern Kitchen Bureau's electric range window display contest were Western concerns. They were, top to bottom: H. L. Stiff Furniture Co., Salem, Ore., which led the department store group; Henry Levy Co., Santa Barbara, Calif., dealer group; Puget Sound Power & Light Co., Lake City office, Seattle, utility group. Other Western winners were Cheyenne (Wyo.) Light, Fuel & Power Co. and Idaho Power Co., utility group; Coast Music Co., Los Angeles, department store group.

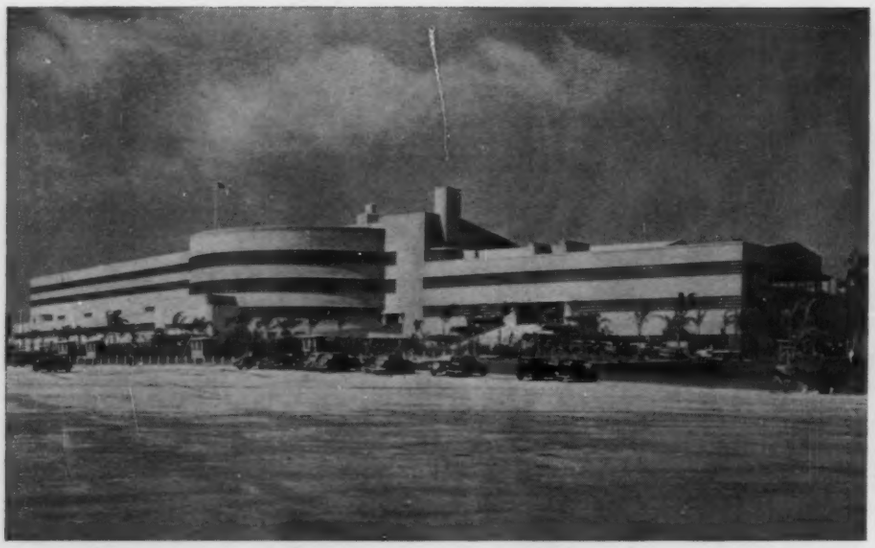


Three prizes were awarded in the window display contest run by the Electric Appliance Society of Northern California in connection with its recent refrigeration campaign. They were, top to bottom: Holman's Department Store, Pacific Grove, District 3 (small towns) winner; Breuner's, Sacramento, District 2 (Sacramento, Stockton, San Jose) winner, and Nathan-Dohrmann Co., San Francisco, District 1 (San Francisco, Oakland, Berkeley) winner. All three winners featured the campaign slogan, "It Pays for Itself, Then Pays You—the New Electric Refrigerator"



ALL MINOR APPLIANCE SALES have been discontinued by Northwestern Electric Co. in line with its policy to build up dealers' sales. Displays of standard brands will, however, be maintained on the utility's floor.

ROCKY MOUNTAIN ELECTRICAL LEAGUE'S annual garden lighting promotion, started last month, so fascinated the public that one lighted Denver park with a 5-acre flower garden received more nighttime than daytime visitors.



New $2,250,000 all-electric racing plant of the Hollywood Turf Club, Inglewood, Calif.

Electrical Race Track

New Hollywood Turf Club Sports a Total Connected Load of Approximately 4,000 kva.

WHEN the public address said "They're off" at the Hollywood Turf Club, Inglewood, Calif., June 10, the public was introduced to the first completely electrical race track in the world. No other form of energy is used in carrying on the multiple operations of this streamlined plant for the "sport of kings." Total electrical connected load is slightly less than 4,000 kva. and a number of noteworthy engineering features have been included in the design.

The 315-acre plant has housing facilities for 1,100 thoroughbreds. It was designed to handle 55,000 spectators without hitch. The combined grandstand and clubhouse constitutes a structure 900 ft. long and four stories high. The electrical load consists of 800 kw. for water heating, 1,200 kw. for cooking, 1,620 kw. for lighting and 270 hp. of miscellaneous motor load. Energy is supplied by Southern California Edison Co.

With an electrical load the equivalent of that of a small community, the plant presented some unique distribution problems. Energy is received underground through a 16-kv. feeder terminating in a concrete transformer vault on the first floor of the clubhouse. From here it is distributed underground to the various substations and vaults at 4,000 volts, 3-phase, 4-star. In vault "A" on the ground floor of the grandstand are the main 4,000-volt breakers, together with three 200-kva. transformers for 3-phase power and three 150-kva. transformers for lighting. The low voltage distribution switchboard is a dead front, dead rear board equipped with carbon air circuit breakers. Vault "B" is similar to vault "A" except that it contains three 75-kva. transformers for lighting and three 200-kva. and three 150-kva. transformers for power. The power transformers feed into a common bus, with the two banks operating in parallel, each through its own air circuit breakers. This provides flexibility by permitting load service from either bank during off-peak periods. A 4,000-volt feed extends underground from this vault to the corporation yard and stable area where power is distributed overhead. A total of 810 kva. of transformers is mounted in small units on the pole structures to supply the 32 stable units, the cafeteria and corporation yard building.

An unusual and interesting feature of the plant is the indoor saddling paddock. This is a depressed circular bowl with a bottom diameter of 80 ft. The sides are in the form of standing steps or terraces extending from the ground to the main floor and opening into the main grandstand proper. The lead-in from the receiving barn to this paddock and the lead-out from the paddock to the track are entirely within the building.

This construction made necessary some kind of lighting which would not shock the horses on entering the enclosed area or returning to the daylight.

Top: Cafeteria kitchen in the stable area takes 225 kw. Bottom: A specially built 380-gal., 80-kw. water heater in the main clubhouse kitchen. Total water heating load is 800 kw.

The installation consists, therefore, of 28 24-in. glass steel diffusers using 1,000-watt daylight blue lamps. The units are in concentric circles mounted flush with the 22-ft. ceiling. With all glare eliminated by the flashed opal diffusers, the soft white light falling over the area is not unlike moonlight. The resulting color, in fact, is almost a perfect match to daylight with an intensity of 25 ft.-candles to the floor. The lead-in and lead-out tunnels have 50 units using 750-watt daylight blue lamps.

Constructed round the center column is the judges' platform, from which point the lights are controlled by means of tumbler switches operating the closing coils of magnetic switches. There are two switches, one controlling 32 kw. and one 34 kw. Mounted on this column are two signal lights constructed of $\frac{3}{8}$-in. diameter vertical glass rods. Behind the glass rods the fixture is divided into three compartments containing red, amber and green lights. These lights are used as signals for timing the saddling of the horses and sending them to the post.

The plant has a Western Electric

Top left: Horse tunnel, lighted with suspension-type reflectors using "daylight" lamps, leading from stable into paddock. Top right: Indoor paddock receives "daylight" illumination from flush-type ceiling units. Bottom left: A battery of transformers and service equipment. Bottom right: Betting windows in the ultra-modern clubhouse are used only by members of the Turf Club

public address system consisting of a cluster of thirteen horns on a 50-ft. pole in the infield with amplifying racks installed in the building housing the totalizing board. Microphone outlets are installed to the winner's circle, the paddock, the governor's box and in a small broadcasting studio. Provision is also made for broadcasting music.

Supplementary public address system is used in calling celebrities' cars parked in the restricted parking lot adjoining the clubhouse. Complete facilities for the National, the Columbia and the Mutual broadcasting systems are provided. Also complete facilities are available for news camera and teletype, as well as Postal and Western Union Telegraph services.

A 60-hp. deep well pump in an underground station in the infield provides water for the three artificial lakes, for all irrigation and for sprinkling the track. Another 20-hp. pumping plant supplies a two-stage water fall between two of the lakes with approximately 1,000 gal. per minute.

The American totalisator equipment and the photo-finish camera are both floated on batteries. Constant operation even in the event of power outage is thereby guaranteed.

Power purposes at the track require 380 kw. for elevators, water supply and ventilation, tote board light and power and for operation of electrical equipment in the print shop and maintenance shop.

Of special interest also is the electric water heating load. There are 26 food and drink concessions, each having its individual water heater or water heaters. Health regulations require an adequate supply of hot water at 140 deg. F. for washing, sterilizing and rinsing dishes and glasses. Each concession is equipped with one or more three-compartment sinks. The washing and rinsing compartments hold 4½ gal. of water which is changed every 30 min. Water requirements were based on this service, and heaters were installed which would provide the necessary quantity and temperature. These are of the high wattage, quick recovery type since larger storage type heaters would not maintain the 140 deg. temperature specified in the health regulations.

Individual heaters for these concessions vary from 50-gal., 10.5-kw. units to 85-gal., 18-kw. units, depending upon the number of sinks in the concession. The majority are 66-gal., 15-kw. installations.

Each of the four large kitchens has its own water heating installation. The main kitchen is equipped with a 380-gal., 80 kw. unit; the turf kitchen has a 290-gal., 40-kw. unit; the coffee shop has a 380-gal., 60-kw. unit, and the cafeteria a 290-gal., 25-kw. unit. In the central coffee-making department there is a 380-gal., 36-kw. heater and a 10-kw. coffee heater.

Balance of the water heating load is made up of storage type units for the showers and toilets. There are nine of these ranging from 8.5-gal., 1.5-kw. to 280-gal., 20-kw. In addition there is 70-kw. of space heating in the offices.

Consulting electrical and mechanical engineer for the Turf Club job was D. R. Hinkston. Newbery Electric Corp. was contractor.

One sure thing about the installation is that racing addicts will be subjected to it on every side. The lure of horses and the thrills of betting $500,000 per day build respect and admiration for the diverse uses of electricity.

Gas, Darkness

Light Transition in Oakland Tube

Twin bores, 3,200 ft. long, 26½ ft. wide, separated at some places by as much as 100 ft., converge at the two portals under structures housing 8 blowers and exhausters for both up- and down-grade tunnels. This is the Oakland portal, housing main control panel shown at left

Either from watching the carbon-monoxide recorders or from warnings flashed or sounded by an automatic alarm system, operators step up speeds of the fan motors through a pistol grip operated drum controller (at extreme left) which times the acceleration or deceleration through four stages without regenerative torque. Fan performance is recorded on the upper row of instruments

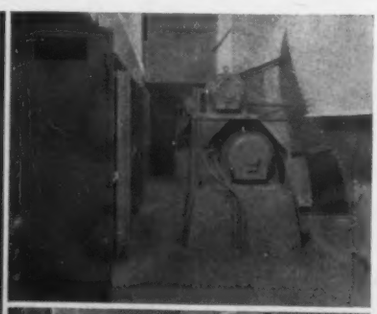
On castors so that they may be moved to permit access to the back for testing or maintenance, the multi-control magnetic breaker cabinets are in the fan room, remotely controlled from the drum on the main switchboard. At left are the 440-volt de-ion nofuse circuit breakers for disconnecting fan motors

COMMON to all vehicular tunnels are lighting and ventilation, but to the recently completed Broadway low-level tunnel which punctures the mountains separating Oakland and Berkeley, Calif., from back-country Contra Costa county and thus opens new traffic arteries to the bay region, Romaine Myers, consulting electrical engineer, brought design economies that he had proved effective in the Posey tube under the estuary between Oakland and Alameda some years before.

Differing from the principles used by eastern engineers in the ventilation of vehicular tubes, Mr. Myers has proved that it is more economical to move large volumes of air at low speeds than smaller quantities at high speed. Blower capacity was added so that slower speeds could be used, with provision for high speed only to meet peaks, estimated to be only 1½ per cent of the time. Accompanying photographs show many of the details of both the blower and lighting installations, made by Alta Electric and Mechanical Co. of San Francisco.

The heart of the speed control for the ventilating system is a drum controller made by Western Electrical & Mechanical Co. of Oakland, which furnishes a positive mechanical timing of the motor and blower speeds and accompanying damper door mechanisms.

Monthly power consumption for the ventilating system runs between 15,000 and 19,000 kw.-hr. Two capacitors of



Each blower or exhauster fan, multi-blade type, 8 ft. in diameter, 10 ft. wide, is connected to two motors—for high speed a 2,300-volt, synchronous (either 360-r.p.m., 150-hp. for blower, or 400 r.p.m., 200-hp. for exhauster) motor on the upgrade system, direct connected on the shaft—or a 50-hp., through spur gear reduction, 165 to 245 r.p.m. on the downgrade system—and for low speed induction motors v-belt connected either to the other end of the shaft or as shown in the picture at right. These low speed assemblies are designed to deliver from 80 to 250 r.p.m. at 2 to 40 hp., or 50 to 140 r.p.m at 1 to 10 hp. in four distinct steps. High speed motors on downgrade are induction type and not normally connected (upper right). When one tunnel is used for two-way traffic in emergencies v-belts are transferred to the emergency high speed motor. Lower right shows zero-speed switch driven off the main shaft to control damper door operation. Induction motors are 40-volt, 3-phase, with 12 separate stator windings to provide 4 speed operation

Checked By Electricity

Louvers Make Portals Safe for Motorists
Fans Made Efficient by Two-Motor Drives

40 kva. each keep the power factor leading or at unity, and earn a favorable rate.

In lighting Mr. Myers innovated a light transition structure at each portal which solves the problem of visual shock caused by necessity of adjusting the eyes to sudden difference between 1 inside from 1,000 to 10,000 millilamberts outside. Extending for 200 ft. from each portal is a canopy made up of a honeycomb of deplated aluminum vanes set at angles from both the perpendicular and latitude and longitude as to permit no direct sunlight to reach the roadway at any season of the year or time of day. Astronomical studies of sun travel were calculated to arrive at the design. Only north sky light filters through to the road, and gradually tempers the intensity of light between tunnel portal and out-of-doors. Accepted eye reaction curves were used to calculate that, traveling at legal speed of 45 mi. per hr., a driver could accommodate his eyes to the change without sensation of difference in lighting. In actual operation this is true.

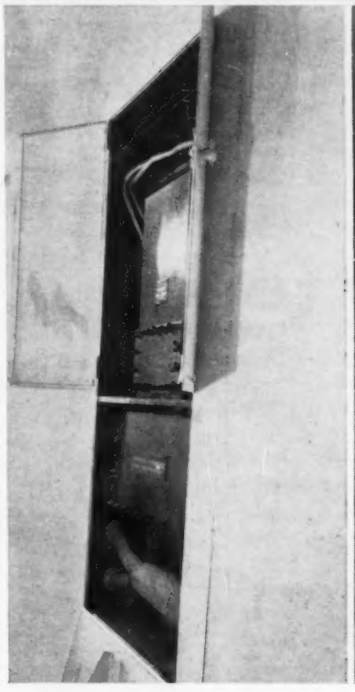
Economy in interior lighting is gained from distribution at 2,300 volts transforming at 16 points to 3-phase 4-wire 110/208, and use of ordinary 150-watt lamps instead of a street series system. Two main circuits and an emergency circuit feed the lighting. A special 4.25-kva., 2,300/208/110-volt, 3-phase, 4-wire, star connected transformer was made for the job by Gardner Transformer Co. of Oakland.

Other interesting details of the electrical design included an interlocking warning system on the carbon-monoxide recorders, photo-electric automatic control of lighting units in the transition structures operated by the sunlight, an electric automatic elevator in the fan house, lighting, heating, signals and inter-communication.

Each tunnel's 22-ft., 2-lane road, catwalk and sidewalk, are lighted by 150-watt Holophane refractor domes in which are used small removable Alzac aluminum spherical section reflectors to shield light in drivers' direction and direct it in that of the travel. Units are mounted in the ceiling, 15 ft. 8 in. above the road, on 15-ft. centers

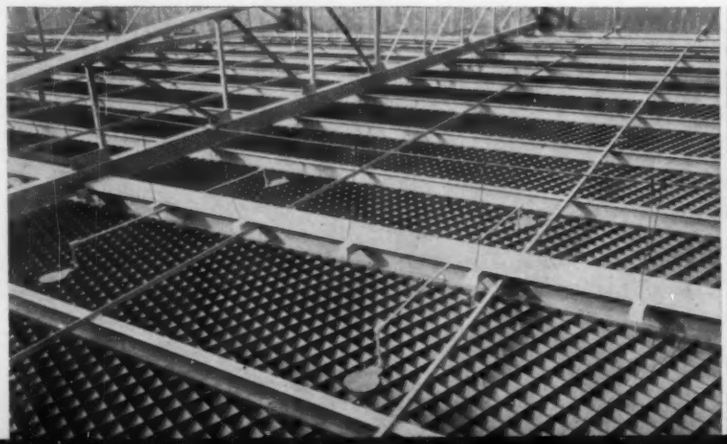
Photo-electric cells are monitors of the three lighting feeders. Located at the West end, they give an indication on the switchboard when a lamp circuit blacks out

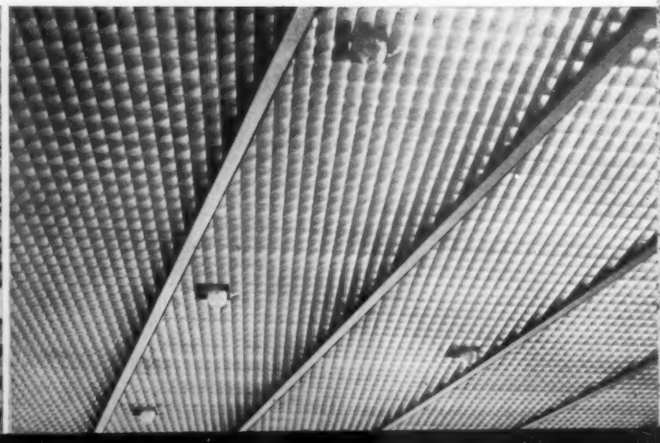
At extreme right is a view down the exhaust air chamber over a tunnel. Lighting units are relamped from here by removing a water-tight cover plate. Bullseye indicates which lamps are burning to find burnt-out lamps. Each unit has a disconnecting plug. Relamping does not interfere with traffic



For economy, lighting circuits are run at 2,300 volts to 16 2,300/208/110-volt special transformers (Gardner) located in cabinets in the tunnel wall (see right) Transformer at top, 2,300-volt disconnects and fuses, and individual circuit fuses are below, with the primary cable, nigrate asbestos fireproofed, seen below. Distribution to lighting units is by 3-phase, 4-wire, 110/208 runs. Laterals between tunnels were run through diamond drilled holes, an idea Mr. Myers brought over from mining days

Below: views of top, (left) and under side of light transition louvers at both portals





Warning!

Doctor cautions air conditioning men to step carefully

Air conditioning cannot remove all variations in climatic change without bringing possible harm to human beings. Such was the warning given by Dr. F. M. Pottenger, tuberculosis sanitarium operator of Monrovia, Calif., to a joint meeting of the Air Conditioning Society of San Francisco and the Golden Gate Chapter, American Society of Heating & Ventilating Engineers last month.

Speaking on the effect of meteorologic forces upon man's physiologic balance, Dr. Pottenger described the relation between climatic changes and what seemed to be epidemics of hemorrhages, temperature rises or even deaths among seriously ill patients. Such crises occurred in a large proportion of his patients during polar storms which brought a radical atmospheric change, he said.

To keep a good physiological balance man needs the stimulation brought by change in temperature, humidity, air pressure and perhaps in electrical change in the atmosphere. If these changes are not too severe—in which case the adjustment to them requires too great strain on the body—they develop in man an ability to resist disease.

Just as tropic conditions cause an enervation which lowers resistance, so may an artificial climate of too even condition enervate those who live and work under it.

Therefore, said Dr. Pottenger, air conditioning should not seek to do more than remove the extremes of heat or cold. It should be content with about a 10 per cent reduction in temperature rather than a maintained 70 deg. temperature. And it should supply an almost perceptible movement of air in order to keep the body stimulated and responsive.

Presiding over the meeting was R. A. Folsom, president of the Air Conditioning Society. Neil Peterson, past president, introduced Dr. Pottenger.

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Shorts

Adequate wiring; school lighting; credit; permission; etc.

PLAN FOR PUBLICIZING Seattle's adequate wiring campaign through purchase of advertising space in a Seattle trade newspaper and release to the paper of news and editorial matter has been endorsed by the executive committee of the Seattle Adequate Wiring Bureau and the Electric Club of Washington. During the six-month duration of the initial phase of the campaign 50 large ads will be run. By adoption of this plan the bureau proposes to educate not only the home owner and prospective builder but also the architect and contractor. A fund is already being raised to finance the campaign.

Seen at Los Angeles' first annual Electric Industry Conference, which led (see Shorts) to the inauguration of the Electrical Development League's adequate wiring program, were: (top) Ross Hartley, president of the Development League; Earl N. Peak, president of the NECA; A. L. Stone, chairman of the conference program committee, and P. G. Spilsbury, Anaconda Wire & Cable Co., breaking the bottle neck of the electrical industry, and (bottom) Burdett Moody, business agent of the Bureau of Power & Light, and Peak talking things over

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CERTIFICATION OF HOMES under the adequate wiring program of the Electrical Development League of Southern California was under way this month following publication of the minimum requirements. Inspection is in the hands of utility and field representatives. Promotion centers round the sound-slide film, "Power for Living."

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SCHOOL LIGHTING EXPERIMENT has been conducted in the sixth grade room of the Lincoln Grammar School, Corona, Calif., by Gordon F. Black of Nevada-California Electric Corp. and members of the Gordon school board. After preliminary light readings were taken at hourly intervals under existing artificial and natural light conditions, the room was reconditioned according to specifications covering painting, wiring, indirect lighting fixtures, photo-electric control and Venetian blinds. J. N. Cochran, local contractor, installed the wiring for six outlets per room and a G. E. photo-electric relay.

ARRANGEMENT BETWEEN the Denver chapters of the National Electrical Contractors' Assn. and the National Retail Credit Assn. has been completed whereby credit information is made available to any Denver NECA contractor. The contractors are also interchanging a record of remnants and odd quantity stock in possession of each man as an aid in liquidating old material and possibly providing a source of special material.

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INSTALLATION OF STANDARD approved types of meter trim disconnect switches instead of the meter sequence type will be permitted in San Francisco after Sept. 1, Ralph W. Wiley, chief of the city's department of electricity, has announced. Cable supports in vertical runs of conduit or raceways must also be of approved type. And after July 1, 1939, all porcelain knobs and tubes must be approved by Underwriters' Laboratories.

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CITY-WIDE SCHOOL LIGHTING survey is now being conducted in Portland by Northwestern Electric Co. and Portland General Electric Co. A lighting survey of all branch libraries of the Portland Library Assn. is also being made.

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ORDINANCE ELIMINATING the $50 fee for building contractors and $25 fee for sub-contractors has been passed by the Bremerton, Wash., board of city commissioners. The ordinance also provides for three free inspections by the city building inspector.

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ELECTRICAL WORKERS' LOCAL No. 68, Denver, has joined in the Denver Electrical League's adequate wiring program. The local, with a membership of 200, not only will assist in distribution of promotional material but has also voted a sum to the fund with which the program will be administered.

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BECAUSE OF ITS NOVEL effect in operation, sodium vapor lighting was chosen for the parking lot of the new Centre Theater, Salt Lake City. The installation, which is the equivalent of one ½-mi. of highway lighting, consists of eleven of the latest series-type, 10,000-lumen highway luminaries mounted on 30-ft. poles.

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NEW LITERATURE for contractors includes "A History of Light," a pocket-size booklet, published by the Western Institute of Light & Vision, designed for use in educating the public, and two handbooks, prepared by National Electric Products Corp., showing a number of saleable applications of plug-in strip and wire molding in home and office.

Work Starts

President Hitchener appoints new PCEA committees

Hardly was the convention of the Pacific Coast Electrical Assn. over before the new president, A. E. Hitchener, called together the new board of directors and the committee appointments and work for the year were begun.

Nominated by President Hitchener and approved by the board were the following committee members: Business Development Section, C. E. Goodwin, manager General Electric Supply Corp., San Francisco, chairman, and W. E. Cranston, Jr., Thermador Electrical Manufacturing Co., Los Angeles, vice-chairman; Operating Economics Section, J. F. Davenport, Southern California Edison Co., chairman, and Allen G. Jones, General Electric Co., San Francisco, vice-chairman; Administrative Services Section, A. D. Church, San Joaquin Light & Power Corp., chairman, and G. C. Delvaille, Nevada-California Electric Corp., Riverside, vice-chairman.

Various committees which are working on projects not completed during the last administrative year were continued. These are: occupational segregation and job analysis; sales training; grounding of electrical equipment on poles; agricultural handbook; highway lighting; industry information; industrial power and heating, and revision of G.O. 64. Among the recommendations of the lighting committee which were approved were the continuation of a special committee to collect educational material, the purchase of two school lighting demonstration kits, the appointment of lighting representatives on the sales training committee and the appointment of a special committee to work with manufacturers in an endeavor to combine both utility and beauty in lighting fixtures. The air conditioning committee was authorized to compile data on varying weather conditions in all sections of the territory that affect the type and kind of air conditioning equipment used.

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Convention Ahead

Southwestern Section, IAEI prepares for October meeting

A. J. Kay, Anaheim, Calif., city electrician and chairman of the Southern California Chapter, Southwestern Section, International Assn. of Electrical Inspectors, has been named chairman of the committee in charge of the manufacturers' exhibits which will form one of the features of the section's convention in Long Beach, Oct. 10-12.

The exhibits, a revival of an old custom, will cover wiring materials, special fittings, lighting equipment, panels, non-tamperable fuses, etc. They will be on display in the Long Beach Municipal Auditorium.

Announced by Harold L. Gerber, section secretary-treasurer, and Otis Newcomb, general convention chairman, are the following committeemen. On the general convention committee are: Newcomb, Kay, A. E. Tracy, city electrical inspector, Redlands; Arthur Veit, Los Angeles County electrical inspector; Frank Short, Industrial Accident Commission; R. H. Manahan, city electrical inspector, Los Angeles; H. G. Ufer, Underwriters' Laboratories, Inc.; W. A. Talbott, San Diego Consolidated Gas & Electric Co., and H. M. Stewart, Southern California Edison Co.

In charge of special phases of the convention are: Information, F. D. Benefield; entertainment, G. E. Price; finance, Newcomb; hotel, B. H. Wheater; publicity, Jack Horner; ladies' entertainment, Mrs. Newcomb; program, Gerber; reception, Ufer; trips and transportation, Tracy; photograph, badges and registration, Charles Morrison; exhibits and contributions, Kay; golf, A. I. Benedict.

Convention headquarters will be Hotel Lafayette.

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Peak's Visit

NECA chief sets Californians on the path to more business

Visit of Earl Peak, president of the National Electrical Contractors' Assn., to California late in May set in motion wheels which are likely to churn out better industry cooperation and more contracting business. Already contractor groups of the larger cities have initiated wiring modernization programs which will tap (1) the industrial and commercial markets, (2) the domestic market.

Peak's speeches—in Los Angeles, Fresno, Sacramento and San Francisco—were responsible for the movement. He urged cooperation of the contractors with other industry groups and pointed to the necessity of the contractors so to conduct their business as to make enough money to finance their share of any industry promotional program. Such financial participation would generate self-respect, Peak said; self-respect would not let the programs fail.

Peak also gave warning that the NECA will prosecute all violators of the Robinson-Patman Act.

Indicative of the scope of the modernization drive is the action taken in southern California. There, after the Electrical Development League, Edison Company and various contractors set the ball rolling, the California Electrical Contractors' Exchange, Southern California Chapter of the NECA and other lesser contractor associations dissolved in order that local NECA chapters might be set up in each city.

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Electrical Code

Northern California inspectors discuss various points

More of the new things to be found in the 1937 edition of the National Electrical Code occupied the discussion at the June 9th meeting in Redwood City of the Northern California Chapter, Southwestern Section, International Assn. of Electrical Inspectors. A. V. Youens of Palo Alto, chairman, presided; Harold Gerber, secretary, led the discussion.

Subjects covered and action taken in regard to each included: The color coding of wires—recommendation was that the strict literal application of the code be changed to permit continuation of the phase colors throughout the wiring system in order to make identification of circuits consistent. Voltage drop table—this, Gerber said, could be used by contractors to sell adequate wiring because of the graphic way in which voltage drop was shown to reduce efficiency of an installation. Non-tamperable fuses—it was agreed that until manufacturers standardize on inserts little can be done to require their use.

Next meeting of the chapter will be held in Sacramento in August.

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ANNUAL DINNER of the Vancouver (B. C.) Electrical Assn. was the scene set recently for the induction of Cale B. Jarvis as president for 1937-38; a speech by Mayor George C. Miller, himself a member of the electrical industry, and the presentation of a skit, "Turn on the Heat." Parts were taken in the latter by James Lightbody, Earl Dunsmuir, Jack Homersham, A. E. Cowsill, W. C. Mainwaring, E. E. Walker and Miss I. M. Harris.

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FIRST JOINT MEETING—at Bakersfield—of the Southern California Chapter, IAEI, and the new Central California Chapter has resulted in instigation of plans by the latter to hold a similar session with the Northern California Chapter. Speakers at the Bakersfield meeting included Joe M. Spain, director of sales, Packard Bell Co., and Harold Gerber, secretary-treasurer of the Southwestern Section. Next meeting of the Southern California chapter will be held at Ontario, Nov. 30.

W. O. Jordan and the 3,200-egg incubator installed in the basement of his residence

Cheap Chicks

How a Washington poultryman gets bigger hatches at lower cost

By C. A. ROOT
Sales Supervisor
Northwestern Electric Co., Vancouver, Wash.

W. O. Jordan, who lives about 8 mi. north of Vancouver, Wash., is making money in the poultry business. He's doing so because he realizes the value of electricity.

Two years ago Jordan was hatching eggs in four small oil incubators. Some of his chickens he kept; others he sold to outside poultrymen. The profits, though not large, were enough to make him see the possibilities in the business.

It was not long, therefore, before he bought two new electric incubators of about 3,200 egg capacity each, set them up in the basement of his house and went to work in earnest. The result was a total—and profitable—hatch of some 15,000 chicks. Even more: On the strength of this business he built a new chicken house, has only recently completed a new tile incubator house which will shelter his present equipment plus two more large electric incubators and is now building a new home for himself.

Jordan's success is anybody's secret. He believes in and practices regular morning and evening lighting for his layers.

His morning lighting period is short, the time being just enough to help him establish a definite morning feeding time which he can follow right through the shortest days of the winter. He holds over most of the extra work hours for the chickens until the evening period. By that time the poultry-house is usually warmer and the chickens more active. Consequently the benefits of the lengthened day are realized to the utmost.

An un-seasonal moult Jordan breaks up by the use of all-night lighting. In one small flock he jumped production, in less than three weeks, from 54 to 160 eggs. To do this he left a 15-watt bulb burning all night near the feed and watering troughs. Food consumption increased markedly at first but gradually tapered off to about normal. Egg production, however, stayed up.

What does the electricity cost him?

In 1935 he used 237 kw.-hr. at a cost of $18.23 for the year, or an average cost per kw.-hr. of 7.7c. In 1936 he used 2,381 kw.-hr. at a cost of $71.84 or an average cost per kw.-hr. of 3.1c. In 1937 he used 4,965 kw.-hr. at a cost of $125.73 or an average cost per kw.-hr. of 2.5c.

Does it pay? Jordan thinks so.

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Sterilized Soil

Nematodes come up against a tough customer in California

Soil sterilization, electricity's most recent contribution to the nursery business, is being utilized profitably by the Blakesley Botanical Gardens, Santa Barbara, Calif. It likewise offers interesting possibilities for the home gardener because the use of sterilized soil is a form of plant insurance. It controls the damping off of seedlings, eliminates weeds and helps produce strong, healthy potted plants and cut-flower crops. The Blakesley Gardens have in use a soil sterilizing cabinet, built there, which offers simple design, low construction cost, economy of operation and portability.

The sterilizer consists of four banks of heating elements, one above the other, in a wooden box 28 in. wide, 30 in. high and 29 in. deep. It is built on 18-in. legs and the bottom is constructed so that it is hinged to the back edge of the box, thus allowing easy discharge of the soil after treating. A close-fitting hinged top also is fitted to the sterilizer. The heating elements are of the calrod type, fitted with brass fins and requiring a total of 3,000-watts during the heating operation.

Gerald A. LaForge, Southern California Edison rural electrification representative, the Blakesley Botanical Gardens' electric soil sterilizer cabinet and gardens employee

Experiments by the Blakesley experts have shown that bringing the soil temperature to 135 deg. F., then turning off the current, successfully eliminates nematodes. This temperature is reached in from three to four hours. Temperatures up to 180 deg. F. have been found necessary to eradicate various types of weed seed. Higher temperatures are likely to kill humus.

It has been found possible to end nematode activity in plants already potted by setting the pot in soil undergoing sterilization and subjecting it to the same temperature. Another use to which the cabinet may be put is the heating of seeds difficult to germinate.

It is recommended that the heavy-duty soil heating thermostat and magnetic relay be used in conjunction with the electric soil sterilizer, the bulb of the thermostat being placed in the soil midway between the elements at the same position usually occupied by a thermometer. Hook-up used should be such as to permit the operator to turn off the electricity when the desired temperature is reached. The magnetic

relay should be reset manually when a new charge of soil is to be heated. Considerable current can be saved by the use of proper control equipment, and the operator can occupy his time in other useful operations while sterilization is progressing.

The cost of the equipment as reported by the Blakesley Botanic Gardens is as follows: Cost of lumber for the box—$13.54; Cost of labor building the box—$8.00; Cost of heating units and installation in the box—$47.60; Total cost—$69.14.

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Dirty Work

"Don't kill yourself hauling manure"—new Swiss maxim

By LARRY MOORE
Agricultural Engineer
Portland General Electric Co.

Most people have read the old washing machine advertisement, "Don't kill your wife at the laundry tub—let our new XYZ washer do the dirty work." With the help of a 3-hp. electric motor the J. Knusels, progressive Swiss dairymen at Scappoose, Ore., have changed that to "Don't kill yourself hauling manure—let electricity do the dirty work."

Knusel starting the manure pump that does the dirty work

Swiss dairymen coming to this country brought with them the practice of collecting all the manure from the dairy in wood or concrete tanks. In earlier days, the semi-liquid collection was pumped out by many different arrangements — frequently by hand-operated pumps, or drawn out by gravity —and hauled to the fields. In connection with the liquid manure tank development, a special open-runner pump was also developed by the Swiss. This pump, adaptable for motor drive, can handle liquids, semi-liquids, straw and trash in a big way.

There has been a number of liquid manure tanks constructed and used—mainly by Swiss dairymen in this country for many years—and a number of the special pumps has been imported for use in connection with the tanks, particularly in the Tillamook area of western Oregon. In most cases, the sprinkler tank wagons have been used to distribute the manure over the fields; but so far as known, the Knusels are the first in this territory to combine the liquid manure distribution system with the irrigation system and so deliver the by-product to the fields "untouched by human hands."

Two years ago Knusels installed a low pressure sprinkler irrigation system in which a concrete main was extended some 2,400 ft. into the center of the fields to be irrigated. Hydrants for attaching the portable sprinkler pipes were placed along the main at every 100 ft.

Last summer, when a new barn was built, a 50,000-gal. concrete tank was installed in the ground under the barn. The gutters were built to drain into the tank so that all the liquid and solid manure could be readily flushed therein. A 3-hp. motor and imported Swiss "luna" pump and a pipe connection to the irrigation line completed the installation.

In operation, the irrigation pump is used to fill the tank about half full of water. In two weeks the tank is filled with manure. Then, in order to mix the contents, the special pump is started and allowed to discharge back into the tank for a day. On the next day the irrigation pump is again started and the pipe line filled with water. Then the manure pump is turned on to force the liquid out through the main pipe and through about 200 ft. of old fire hose which distributes from the surface pipe and hydrants. It takes about 8 hrs. to complete the job of emptying the tank. Immediately after the tank is emptied the irrigation pump flushes the pipe line and charges the tank half full of water for the next cycle.

The ease and convenience of doing an otherwise strenuous and unpleasant job would be sufficient argument for making the installation. But best of all, the fields are already beginning to respond to the more valuable manure that has not had 50 to 80 per cent of the plant food drained down to the creek. Also, the system is an important factor in the maintenance of one of the cleanest barns and premises to be found for miles around.

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New Uses

The California CREA goes to work on several projects

Progress is being made by the California CREA on several projects aimed at developing new uses for electricity in agriculture. Among the studies reported at a recent meeting of the committee is the construction and operation of a completely air conditioned greenhouse of commercial size.

Tests are being made of the application of "Arizona coolers" to egg cooling and storing, and also to laying houses on poultry ranches. A detailed study is being made of power requirements of dairy ranches by means of submetering on equipment at 21 dairies. Tests are also being run on electric sterilizers.

Spreading—or spraying—the liquid manure

EDITORIAL

Federal Regulation Comes High

THE equanimity with which state utility regulatory commissions have sat by and consciously or unconsciously sanctioned the invasion of their fields by federal agencies seems to lend credence to the charge of the demagogue that utility regulation has failed.

One might reasonably expect that either one or both of two Western commissions would resent and criticize the action of federal bureaus which have burdened a small Western power company with $30,000 of out-of-pocket extra operating expense. Because a small portion of its business is interstate, this company must conform to the provisions of Title II of the holding company bill. Despite the fact that its rates are reasonable, its public relations good and its service excellent, the company must undertake an original cost study of its property, fill out hundreds of pages of questionnaires and reports and expend thousands of dollars tracking down useless information. That the $30,000 of expense will preclude continuation of an uninterrupted series of annual rate reductions of approximately that amount seems to make little difference.

If the public which this company serves was aware of these facts, it might justifiably ask the state regulatory commissions for an explanation.

Opportunity for the Rank and File

HOW could the rank and file of our people help our public relations? They did not know the answers to the questions the public was asking them about the company." When a power company executive made this statement at a recent convention he pointed his finger at one of the weak spots in the whole industrial structure. In casting about for a means of creating favorable public opinion, management has overlooked its most vital ally—the worker.

That the industrial worker wants information has been revealed in a national survey conducted by the National Association of Manufacturers, the findings of which were divulged at a recent Pacific Coast meeting. In determining what employees think about management one of the questions asked was "Do you want information from your employer?" The answer was a decided affirmative on three subjects vital to industry today. A total of 73.4 per cent of all the men and women interviewed wanted information about business conditions, particularly as they affected the company they worked for; 68 per cent wanted information about laws governing wages and hours; 52.9 per cent wanted to learn about taxes affecting business.

Of equal significance was the answer to the question "How do you want this information conveyed?" Bulletin board posters were the choice of 39.8 per cent of the workers. Meetings called for the purpose of presenting information were almost equally popular with 39 per cent suggesting that method. Enclosures in pay envelopes, company magazines, material mailed to the home and motion pictures had little appeal, ranging from a choice of 7.8 down to one per cent.

The revelations confirm an investigation made by the Industry Information Committee of the PCEA. The electrical industry needs a program which will take the whole industry story to every rank and file member. It needs this to promote understanding, to provide solidarity and to win public goodwill. Perhaps the NAM survey can help chart a sound course.

1/130,000,000th of the Job

SOME one ought to make an estimate of the amount of time which is wasted in discussions of the "repression", "depression" or whatever you want to call it. A busy engineer made the statement recently that nine out of every ten salesmen who call on him spend 90 per cent of their time talking about how bad business is and less than 10 per cent trying to sell him something. Few of them, he said, appreciated the perfect opportunity they provided for him to dismiss them easily with some such remark as "Yes, our business is bad also; we aren't buying anything."

This engineer had a suggested remedy. It was an enlarged photostat of a sign proposed by Henry G. Weaver, head of General Motors' Customers' Research Bureau. A few quotations will serve to make his point clear:

"If it's general business conditions that you want to discuss, I'm afraid I won't be very helpful because I'm only a detail worker and I don't know anything about the broad economic situation. I'm not an economist, I'm not a statistician, I'm not a forecaster, I'm not a high executive. . . . Just for the sake of argument, I'm willing to grant that things are mighty bad and there's a chance that they may get worse—in proportion to the time that you and I take away from our respective jobs to indulge ourselves in dire predictions. I don't mean to be impolite and if you've got your heart set on the hopelessness of the situation, I don't want to do anything to spoil your fun, but as for me—well, I've got work to do.

"From the broad, overall economic viewpoint, I'm not contending that my work is important—

but from my own selfish viewpoint it's mighty important for me to think that it's important. And maybe it could be made a good deal more important if I'd dig in and do a better job, because to be perfectly honest about it, there are lots of things about my work that I ought to be doing better and there are lots of other things that I ought to be doing that I haven't even begun to do. . . .

"In this land of the free and home of the brave, with a population of 130,000,000 people—all created free and equal—I estimate that my individual responsibility figures out at about 1/130,000,000th of the total job. That's my quota, so to speak, and I think I'm going to make it. . . . Multiply it by 130,000,000 and then—well, maybe you've really got something!"

That Mr. Weaver may have something is demonstrated by the experience cited by a salesman. He said recently, "They no longer throw business over the transom to you. You have to go out after it."

All of this seems to add up to a moral—things are not going to get any better unless and until every last one of us *works* to make them better.

Salesmen's Crusade

KIPLING, who knew soldiers, put into the words of a Cockney Tommy Atkins, one of the most remembered plaints yet written—"It's Tommy this, and Tommy that, and 'Chuck 'im out the brute!' But it's 'Savior of 'is country,' when the guns begin to shoot." And because salesmen are the foot-soldiers of business and industry, many a salesman Sam has felt about his job the way Tommy Atkins felt about soldiering. Even the commander-in-chief has said, "Chuck out the high pressure salesman," in accusing him of being one of the causes of the recession.

But as anyone who knows anything about war knows that no campaign can be won without the soldier, just so any business man knows that no recession can be whipped without selling, without salesmen. It is more than merely important, then, that the Salesmen's Crusade, initiated by the head of a great sales organization, be made the rallying call to arms of salesmen everywhere. We need "saviors of the country" from the ranks if this recession is to be turned into a forward march.

A crusade against fear, a crusade against the blues, a crusade against do-nothingness—this is so vital and so fundamental that not all the handouts to the unemployed can begin to compare with what such a crusade can do to turn the tide. Even the fun of trying, whether the results measure up to full expectations or not, will be better far than the inaction of despond.

In Denver the Salesmen's Crusade was started with all hands and the cook. The mobilization of the shock troops of business began at the first sound of the call. And even now, George Lewis, manager of the Rocky Mountain Electrical League, reports, the effort is being felt in local trade. His words are an inspiration to any other region and a call to the colors for all salesmen everywhere.

"The mid-summer business slump in the Rocky Mountain region has been postponed indefinitely—at least by the Electrical League and its various chapters. Vigorous sales programs—local, regional and national in scope—are in progress or in the making, on practically every sector.

" 'Nobody ever puts in Adequate Wiring,' yet it is being installed, much of it in electrical kitchens—by those who can't afford them.

" 'IES lamps never sell in the summer,' yet thousands are being connected—many in outlets which have suddenly appeared in walls which never before had their surface scratched by a contractor.

"New refrigerators are replacing hundreds of old ones which were budgeted by their owners to totter along for another year.

"Business competitors who never before spoke to one another now huddle together at league gatherings, their chatter rivalling that at a women's club meeting.

"Price-cutting implements and the chisel are finding their place along with the bow and arrow and other relics of warfare.

"Fall appliances and load-building vehicles already are being fabricated. Christmas, with its attendant electrical merchandising programs, is just around the corner.

"Verily, the salesman, now and for the balance of the year, will be the Santa Claus of the electrical industry!"

ELECTRICAL WEST

DEVOTED TO THE ECONOMIC PRODUCTION, TRANSMISSION AND DISTRIBUTION OF ELECTRIC POWER AND ITS APPLICATION TO INDUSTRY, COMMERCE, AGRICULTURE AND HOME IN THE PACIFIC EMPIRE, AND TO THE MARKETING OF EQUIPMENT AND APPLIANCES AND OTHER UTILIZATION DEVICES IN THAT AREA

Men at Work

TO disparage is the fashion. Motives, methods and results are fair game for any man with a malicious impulse and a glib tongue. Yet each man considers his own motives good. And he is proud of his methods. Just give him the reins, he says, and watch results.

In the midst of this fashionable conceit it is reassuring to take notice of a sphere of action where a bluff is always called, where the uninformed critic hesitates to speak. That engineering has a moral, almost a religion, is too often overlooked. It has but one objective: to lighten labor. It has but one method: persistent, logical experiment. And its results are all about us. Look and see.

NEWS OF THE INDUSTRY

LOS ANGELES SYNDICATE WINS SHASTA CONTRACT

July 2—Pacific Constructors, Inc., Los Angeles, today was awarded the Shasta Dam contract on its $35,939,450 bid.

Bids for construction of Shasta Dam, varying in amount by only $263,000, were under consideration last month by the Bureau of Reclamation.

Low bidder at $35,939,450 was Pacific Constructors, Inc., Los Angeles, a syndicate of the following 12 contracting firms: Griffith Co., Los Angeles; Metropolitan Construction Co., Los Angeles; Lawler & Maguire, Butte, Mont.; Arundel Corp., Baltimore; American Concrete & Steel Pipe Co., Los Angeles; Foley Bros., New York City; D. W. Thurston, Los Angeles; Shofner, Gordon & Hinman, Denver; W. E. Callahan Co. and Gunther Shirley Co., Dallas; A. Guthrie & Co., St. Paul; L. E. Dixon Co., Los Angeles, and Hunkin-Conkey Co., Cleveland.

Only one other bid was submitted. It was by the Shasta Construction Co., San Francisco, a syndicate of nine firms, for $36,202,357.

Specifications provide that the successful bidder must start work within 30 days after receipt of official notice and will be allowed 2,000 calendar days to complete the job. Liquidated damages for delay will be assessed at the rate of $2,000 a day.

Bids cover the performance of all work, including furnishing labor and equipment, for construction of the dam and power plant. Not included is the supplying of materials, which will be purchased under separate contract.

Contract work involves the excavation of 3,000,000 cu. yd. of earth and rock to prepare the foundation; the manufacture and placement of 5,500,000 cu. yd. of concrete, along with 26,000,000 lb. of reinforcement steel, in the dam and power house; compacting 1,500,000 cu. yd. of earth and rock fills; installation of 13,000,000 lb. of large penstock and outlet pipes, 8,000,000 lb. of small tubing for cooling and grouting, 13,000,000 lb. of steel gates and control mechanisms and 3,000,000 lb. of trashrack steel.

PORTLAND GENERAL ELECTRIC CO. is constructing new lines and holdings through Willamette Valley. Work, which will cost $1,375,000, includes construction of a 24,000-volt transmission line and five outdoor substations to serve Mt. Angel, Canby, Hubbard, Woodburn and Beaver Creek.

ELECTRIC SERVICE on Montana Power Co. lines in central Montana was interrupted late in May by a heavy 48-hr. snowfall. In spite of numerous outages, however, trouble shooters were in all cases able to restore service within a few minutes. According to General Superintendent M. S. Buck, the damage was greater than that caused by the 1927 Memorial Day snowstorm and resulted in the only serious break in company service in the past eleven years.

BIG THOMPSON PROJECT APPROVED BY ROOSEVELT

President Roosevelt last month approved the $44,000,000 Colorado-Big Thompson project designed to divert 310,000 acre-ft. of water from the Colorado River though a 13-mi. tunnel under the Continental Divide to provide irrigation water on the eastern slope.

Besides the tunnel and canal system, the project comprises two pumping plants and an initial installation of 30,000 kw. of generating capacity. This will ultimately be increased to 142,500 kw. Available for public distribution will be excess power above the 18,000 kw. demand of the pumping plants.

First power plant will be located ½ mi. east of Estes Park, Colo., and will contain two 15,000-kva. generating units operating under a static head of 746 ft. Average annual output is estimated to be 207,000,000 kw.-hr. As the market for power grows five additional plants will be installed.

$1,500,000 STEAM PLANT AUTHORIZED FOR GLENDALE

Construction of a $1,500,000 municipal steam generating plant to furnish the City of Glendale additional power was authorized last month by the city council following a session during which the city manager was instructed to file application with the PWA for financial aid toward cost of the plant.

The project was opposed by the Glendale Industrial Assn's power committee, which contended that the city could purchase from the Los Angeles Bureau of Power & Light and Southern California Edison Co. any electricity needed in excess of the volume now received from Boulder Dam.

Plans also were made by the council to employ a mechanical engineer to design and supervise construction of the plant. Carl Heinze, who recently made a survey of the city's power needs, already has been retained as consultant.

KW. YEAR RATES SET FOR BONNEVILLE; LINEWORK BEGUN

Bonneville project last month began to assume proportions of a genuine operating utility when the Federal Power Commission announced approval, with only a few changes, of Administrator J. D. Ross' proposed rate structure and construction crews started building the first transmission line from the dam.

Four rate schedules—instead of the nine submitted by Ross—were passed by the commission: For primary power on the transmission system, $17.50 per kw.-year; secondary power, $11.50. For primary power at the power plant, $14.50 per kw.-yr.; secondary power, $9.50.

All minimum quantity requirements were eliminated. Additional inducement to cooperative associations and other small users with a demand of less than 1,000 kw. to distribute Bonneville power was a special ½c-per-kw.-hr. rate. This rate will be in effect for a 2-year developmental period so that the consumers can build up their loads. After the developmental period, the rate will be the same as to larger users.

The commission also empowered Ross to make contracts for the sale of primary power for periods of 5 to 20 years, secondary power for periods of 1 to 20 years.

General public acceptance of the rates was not indicated in newspaper dispatches. The Portland Chamber of Commerce announced at-site rates were too high and appointed a special committee with the authority to make a complete study of the rates and, if necessary, to employ technicians to determine what the rates should be.

Despite the storm brewing, construction crews were hard at work on the first transmission line, a 4.6-mi., 13.8-kv., $10,000 line from the dam to the town of Cascade Locks, Ore., the first city to contract for power. Hope was that the line would be ready by July 9, when completion of the dam will be celebrated by mid-Columbia cities.

That Cascade Locks business men who underwrote the agreement to take 100 kw.-yr. of Bonneville power for one year would not exactly welcome the line was a conclusion editorialists were drawing. Offers to resell the power to West Coast Power Co., which now serves the town, were called off when Ross refused to permit the city to sell the power to the company for resale to power users in the city.

The Cascade Locks city council

GUESTS were threatened with KEROSENE LAMPS

Shell helped avoid a Diesel breakdown threatening light, refrigeration and power at this hotel

THE modern hotel guest doesn't expect to have to use an old-fashioned kerosene lamp. He demands every convenience! Yet these conveniences—power, light and refrigeration—were threatened at a resort at Eau Claire, Wisconsin, by a balky Diesel power plant.

The hotel engineer found it necessary to overhaul this engine every ten days, replacing two or three rings each time. Oil consumption was extremely high and excess carbon clogged exhaust ports and ring grooves.

Working with the inn's maintenance men, Shell engineers carefully examined every phase of this Diesel's operation. Shell engineers then recommended the correct grade of Shell Talpa Oil for this type of Diesel and, as a fuel, "Shell Dieseline."

A thorough test with these products showed surprising results. Oil consumption was reduced to ¼ of the former amount! Fuel consumption was cut ⅓. And after 30 days, rings were found to be free with no carbon formation.

Case history No. 2329 from the Shell files contains a moral for every Diesel operator! Improperly lubricated, any Diesel can be a source of constant expense and trouble. The *correct* lubricants can bring you the service you expected when you invested your money. Shell experience in the Diesel field and Shell Diesel Lubricants can assure you this service—a big "plus" in lubrication. You can get it by phoning or writing your nearest Shell office.

SHELL Industrial LUBRICANTS

offered a way out, however, when it voted $12,000 to purchase the private utility's system or to duplicate it in competition.

On yet another front, Administrator Ross told a meeting of the Washington Assn. of Public Utility District Commissioners that it would tax Bonneville's resources to care for the demands now being made for power, and that he has already made application to Washington, D. C., for $21,375,725 to construct a power line from Bonneville to Grand Coulee through Pasco and Yakima, Wash.

●

Utah Power to Carry Provo Case to U.S. High Court

Judgment of the Utah state supreme court in the Provo municipal power case was stayed last month after Utah Power & Light Co., the plaintiff, announced its intention of carrying an appeal to the U. S. Supreme Court. As a result of the order, work on the municipal power plant cannot be started until the high court disposes of a petition for a writ of certiorari sought by the utility or reviews the case.

Meanwhile the proposed plant was attacked on another side. A movement was started by a committee opposing the plant to have Provo residents vote again on the question. Reason for the action, according to the committee chairman, was the changed conditions—Utah Power's reduced rates—since voters expressed themselves favorably nearly two years ago.

●

SOUTHERN CALIFORNIA EDISON CO. employees who are amateur radio operators have been invited by Fred B. Lewis, vice-president and general manager, to consider plans for the formation of an Edison amateur radio network to provide communication facilities during emergency periods. The proposal follows the successful use of amateur radio during the flood disaster of March 2. At that time the company availed itself of amateur operators, but because of the lack of information concerning stations operated by company employees it was impossible to make fullest use of the service. According to Lewis the proposed network would be available to anyone during emergencies.

●

FEDERAL POWER COMMISSION has rescinded its order authorizing the issuance of a license to the City of Idaho Falls, Ida., for an 18,000-hp. hydroelectric project to be constructed on the Snake River. Commission's action is the result of failure by the city to accept the license, already tendered to it, within the time limit prescribed by commission rules.

Eight Nevada Towns Get Lower Commercial Rates

Reduction of commercial rates by Sierra Pacific Power Co. in Sparks, Reno, Carson City, Minden, Gardnerville, Yerington, Lovelock and Virginia City, Nev., became effective July 1 in accordance with an order by the state public service commission. The reduction means a maximum saving of $5 per month to anyone using more than 500 kw.-hr., the commission said.

Rate schedules are as follows: Schedule C—first 60 kw.-hr., 5c; next 250, 4c; all in excess, 2c. Schedule C-1—first 60 kw.-hr., 6c; next 250, 5c; all in excess, 3c. Schedule C-2—first 60 kw.-hr., 7c; next 250, 6c; all in excess 3c.

In announcing the new rates the commission also reported that a study of a contract under which Sierra Pacific is to purchase power from Pacific Gas and Electric Co. was made and the contract deemed "fair and equitable." This proposed agreement calls for construction of a second transmission line, to start at P. G. & E.'s Drum hydro plant on the Bear River, Calif., at a cost of approximately $500,000.

●

CONTROVERSY BETWEEN the Cities of Seattle and Renton over the routing of the Skagit transmission line came to an end last month when Renton officials granted Seattle City Light a franchise to build the line across its northern city limits. The agreement will mean an installation saving to the utility of about $100,000, inasmuch as the line had previously been scheduled to circle Renton on three sides.

●

WORK ON THE INSTALLATION of additional transformer capacity at Northwestern Electric Co.'s Albina station in Portland and at Camas, Wash., is now under way. Costing a total of $33,500, the projects will increase the Albina capacity to 18,000-kva., the Camas capacity to 1,200-kva.

●

TACOMA, WASH., CITY LIGHT DEPT. has received a 25-yr. franchise from Pierce County commissioners to construct transmission lines east of Lake Steilacoom. Construction is scheduled to start shortly.

●

IDAHO POWER CO. was scheduled to complete its new switching station at Caldwell, Ida., last month and cut over the 132-kv. line into the 66-kv. system.

●

SCHEDULED FOR COMPLETION late last month by San Joaquin Light & Power Corp. was a $275,000 twin-circuit, 110,000-volt line from the enlarged Mendota substation to Dairyland and LeGrand substations.

HOPES THAT SCATTERED AREAS which voted in favor of the Seven-County Public Utility District in Oregon would be able to proceed with formation of the district in spite of the majority rejection of the proposition received a setback last month when the attorney general ruled that no part or parts of a proposed public power district may organize if a majority of the residents of that district vote against organization. The vote in the Seven-County district was 21,524 opposed, 13,537 favored. The attorney general held further that even if the over-all vote were favorable the Oregon Hydroelectric Commission would have power to deny the privilege of forming a district. The ruling will apply to all future elections.

LINN COUNTY, ORE., voters have turned thumbs down on the proposed formation of a people's power district. Vote was 3,863 against the district, 3,008 for.

●

Idaho Power Reduces Rates 22nd Time Since 1927

Idaho Power Co. customers will save about $100,000 a year as a result of the company's recent rate reduction—the 22nd since 1927. In place of four separate rates formerly in effect for lighting, refrigeration, cooking and complete residential service, including water heating, the company now has two rates.

The first, covering lighting, refrigeration and cooking, is: 90c for the first 11 kw.hr.; next 19 kw.-hr. at 5c per kw.-hr.; next 104 at 2½c; all additional at 2c. Complete residential service schedule is: 90c for the first 11 kw-hr.; next 19 kw.-hr. at 5c each; next 80 at 2½c; next 80 at 2c; all additional at 1½c.

●

WEST KOOTENAY POWER & LIGHT CO. is installing two new generating units at Upper Bonnington on the Kootenay River to develop 30,000 hp., most of which will be used by the Trail smelter of the Consolidated Mining & Smelting Co.

●

FIRST HEARING on condemnation proceedings filed by the Sacramento Municipal Utility District against Pacific Gas and Electric Co.'s electrical distributing facilities in Sacramento will be held Oct. 4 before Ray Wakefield of the California Railroad Commission.

●

CONSTRUCTION OF the proposed Swamp River hydroelectric power plant near Barkerville, B. C., is scheduled to begin almost immediately. A. R. Bonnycastle, Vancouver electrical engineer, is in charge of plans for the development, which will serve the nearby gold mines.

TWO DAYS AFTER VOTERS of Olympia, Wash., granted the Puget Sound Power & Light Co. a 25-yr. franchise extension, the county commissioners of Thurston County (of which Olympia is county seat) passed a resolution to place the question of forming a county-wide public power district on the November ballot. In 1936 the county elected a number of power district commissioners but voted down the proposal to form a district.

●

Dealer Sales Courses Now Operating in Los Angeles

Four groups of dealer sales courses covering four different Los Angeles districts are now operating under the training methods of the California Board of Education and the Electrical Development League of Southern California. Alfred D. Gould, formerly of the Bureau of Power & Light sales division, is director of the work; teachers of the classes are men taught the conference leading technique in an earlier series of classes.

Outgrowth of the first group of classes was the development of a clearing house for dealer salesmen. Under this plan, when the dealer requests salesmen the league advertises in local papers for salesmen and arranges with manufacturers and utilities for their training in the field of appliance selling. The salesmen are then placed in the store where they most logically fit.

●

FEDERAL POWER COMMISSION approval has been given the transfer of license for the Flathead project, located on Flathead Lake and River, Mont., from Rocky Mountain Power Co. to Montana Power Co.

●

GROSS OPERATING REVENUES of San Diego Consolidated Gas & Electric Co. for the year ending April 30 totaled $8,124,038 as compared with $8,119,758 for the corresponding period 1937.

●

GROSS OPERATING REVENUES of Mountain States Power Co. for the year ending March 31 totaled $4,149,376 as compared with $3,747,931 for the corresponding period 1937.

●

GROSS OPERATING REVENUES of Southern Colorado Power Co. for the year ending April 30 amounted to $2,332,344 as compared with $2,278,499 in 1937.

●

SOUTHERN CALIFORNIA EDISON CO. has opened a new all-electric, air conditioned office building for the Montebello district commercial staff at 920 Whittier Blvd., Montebello. Installed in the building is reverse cycle air conditioning equipment and latest type indirect office lighting fixtures.

At Last---

A REAL METER SEAL

that is just like money—hard to counterfeit

THAT WILL LAST

These new Superior Shurlok Vitriseals come in two-color combinations that won't peel, fade, corrode or deteriorate from the action of light, moisture, dirt, age or friction.

THAT IS MODERN

Take advantage of the seven colors (black, blue, green, red, yellow, orange and white). Give different departments in your company Superior Shurlok Vitriseals with your company name or emblem on them in different color combinations. Or change your color combinations every year.

THAT IS PROTECTED

Superior Shurlok Vitriseals are manufactured only in the Superior factory. They are sold only to and direct to those Utilities using apparatus equipped with Superior Shurlok latches. These seals are not sold in the open market.

If you haven't received your sample yet, Write for it.

Superior Switchboard & Devices Company

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*Been at it Since 1920

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No. 201 N. E. Klein Side Cutting Plier. "Streamlined" for use in confined spaces.

Good workmen demand good tools. In the hands of men who know — everywhere — the pliers are invariably Kleins. Only the keen, hand-honed, perfectly matched cutting knives of Klein Pliers — only the comfortable spring grip in the Klein handles — only the general all around quality that is an inherent part of every Klein Plier can satisfy men whose work demands the best in tools. This, perhaps, explains why Klein Pliers are the standard of quality by which others are judged — why the name Klein has stood for maximum quality, "since 1857."

DISTRIBUTED THROUGH JOBBERS

Foreign Distributor: International Standard Electric Corp., New York

---

The four pamphlets listed below will be sent without charge to anyone interested. Check the ones you want:

- ☐ **Safety for the Pole Climber.**
- ☐ **Specifications on Linemen's Belts and Safety Straps.**
- ☐ **The Safety Factor on Linemen's Leather Goods.**
- ☐ **Pocket Tool Guide.**

Mathias KLEIN & Sons
Established 1857 — Chicago, Ill. U.S.A.

3200 BELMONT AVENUE

Test Your Knowledge on Professor Puzzlewit Quiz

No score higher than 80 per cent; average score less than 50 per cent. Such was the result of the question-and-answer program—a test of knowledge of the electrical industry — presented recently by the San Diego Electric Club and the San Francisco Electrical Development League.

Devised by "Professor Puzzlewit"—L. M. Klauber, San Diego Consolidated Gas & Electric Co., vice-president—, originated by the San Diego club and later adapted by the San Francisco League, the test is based on the current vogue of question-and-answer radio programs. Questions, with four possible answers (of which one is correct), are listed below. Correct answers are on page 50.

(A) The open circuit voltage of an ordinary dry cell is about (1) 1 volt; (2) 1½ volts; (3) 2 volts; (4) 3 volts.

(B) The 1937 N.E. Code provides that convenience outlets in major rooms of residences shall be spaced not to exceed how many feet apart? (1) 5; (2) 10; (3) 15; (4) 20.

(C) The metal having the highest electrical conductivity is (1) aluminum; (2) copper; (3) platinum; (4) silver.

(D) What is the approximate diameter of No. 1/0 B & S gauge bare copper wire? (1) ¼ in.; (2) ⅓ in.; (3) ½ in.; (4) ⅔ in.

(E) Who is generally credited with having invented the polyphase induction motor? (1) Kelvin; (2) Edison; (3) Telsa; (4) Steinmetz.

(F) What is the correct statement of Ohm's Law? (1) $I = \frac{E}{R}$; (2) $R = EI$; (3) $R = \frac{I}{E}$; (4) $E = \frac{R}{I}$.

(G) What is the principal reason for the phenomenal progress of rural electrification in California? (1) availability of hydro electric energy; (2) low rates; (3) prosperous farmers; (4) necessity for irrigation.

(H) Which of the following electrical appliances enjoys the largest sale per consumer? (1) washing machine; (2) vacuum cleaner; (3) flat iron; (4) refrigerator.

(I) Twenty pounds of No. 40 S & S gauge bare copper wire would about reach from the Palace Hotel, San Francisco, to (1) Cliff House; (2) San Jose; (3) the Moon; (4) Del Monte.

(J) How fast does a high frequency radio wave travel? (1) 1,000 kilocycles; (2) 1,100 ft. per sec.; (3) the speed of light; (4) 300,000 m. per sec.

(K) What fundamental advantage have DC motors over AC? (1) ease of speed control; (2) higher efficiency; (3) cheaper first cost; (4) quieter in operation.

(L) What element has the peculiar property of changing its resistance as the light shining on it changes? (1) helium; (2) platinum; (3) selenium; (4) tellurium.

(M) What material is often employed as the active material in photo electric cells? (1) platinum chloride; (2) silver nitrate; (3) granulated carbon; (4) potassium hydrate.

(N) At the end of 1937 the number of telephones in the U. S. per hundred of population was (1) 14.7; (2) 12.2; (3) 19.1; (4) 9.5.

(O) A pothead is a (1) bus insulator; (2) groundman; (3) oil switch safety valve; (4) cable terminal.

(P) Edison's first patent was taken out on a (1) stockticker; (2) phonograph; (3) vote recorder; (4) telegraph sounder.

(Q) About how far will 60,000 volts of 60 cycle current jump across a needle point spark gap? (1) 2¼ in.; (2) 4½ in.; (3) 6½ in.; (4) 10 in.

(R) No. 14 rubber covered wire has a carrying capacity of (1) 10; (2) 15; (3) 20; (4) 25 amp. under the N.E. Code.

(S) Approximately how many heat units are there in one kw.-hr.? (1) 3400; (2) 3000; (3) 2600; (4) 4000.

(T) The electrolyte of the ordinary lead storage battery is dilute (1) nitric acid; (2) hydrochloric acid; (3) caustic potash; (4) sulphuric acid.

(U) What piece of apparatus is particularly essential to a radio receiving set? (1) transformer; (2) condenser; (3) vacuum tube; (4) detector.

(V) What is the standard sized conduit required by the code for 6 No. 1/0 conductors? (1) 1½ in.; (2) 2½ in.; (3) 3½ in.; (4) 2 in.

(W) The total electrical energy handled by California distributors in 1937 was (in billions of kw.-hr.) (1) 11; (2) 4; (3) 8; (4) 6½.

(X) A mile of No. 8 bare copper wire weighs about (1) 128; (2) 264; (3) 371; (4) 392 lb.

(Y) The first Atlantic cable over which messages were transmitted was laid in (1) 1852; (2) 1858; (3) 1862; (4) 1866.

●

Contracts Awarded

By G. B. McDougall, California state architect, to Eddy Electric Co., Stockton, for electrical work on laundry addition at state hospital grounds, Stockton, $7,500.

By trustees of San Mateo (Calif.) Junior College and High School District to R. M. Butcher, San Jose, for electrical work on new science building for junior college plant, $17,462.

By G. B. McDougall, California state architect, to Alta Electric & Mechanical Co., San Francisco, for electrical work on six buildings for state hospital grounds, Imola, $21,400.

By Los Angeles Board of Public Works for ornamental street lighting systems to R. A. Wattson, $18,998; E. C. Nickel, $31,803; R. H. Walker, $25,723.

By Golden Gate International Exposition for high bay lighting of palaces to Victor Lemoge, San Francisco, $4,007, and to Central Electric Co., San Francisco, $3,320. For electrical fixtures for air terminal building to Abbett Electric Co., San Francisco, $6,050.

To O. A. Carlson Electric Co., Seattle, for installing totalizing board at Longacres race track, including stringing 1,250 wires across track, $150,000.

By G. B. McDougall, California state architect, to Alta Electric & Mechanical Co., San Francisco, for wiring on detention buildings at state hospital, Eldridge, $7,143.

To H. H. Walker, Los Angeles, for electrical work, outside electrical service connections, etc., in new hospital building, Reno, Nev., $31,434.

By Madison Park Housing Corp., Seattle, for wiring of 18 two-story apartment struc-

This happened IN OLD CHICAGO

. . . THE SAME OPPORTUNITY IS YOURS WITH THE SQUARE D MULTI-BREAKER

BLOCK ELECTRIC COMPANY
ELECTRICAL CONTRACTORS FOR ALL CLASSES
2220 NORTH CLARK STREET
CHICAGO

March 28, 1938

Square D Company
1144 W. Washington Blvd.,
Chicago, Ill.

Attention: Mr. Louis W. Esterling

Gentlemen:

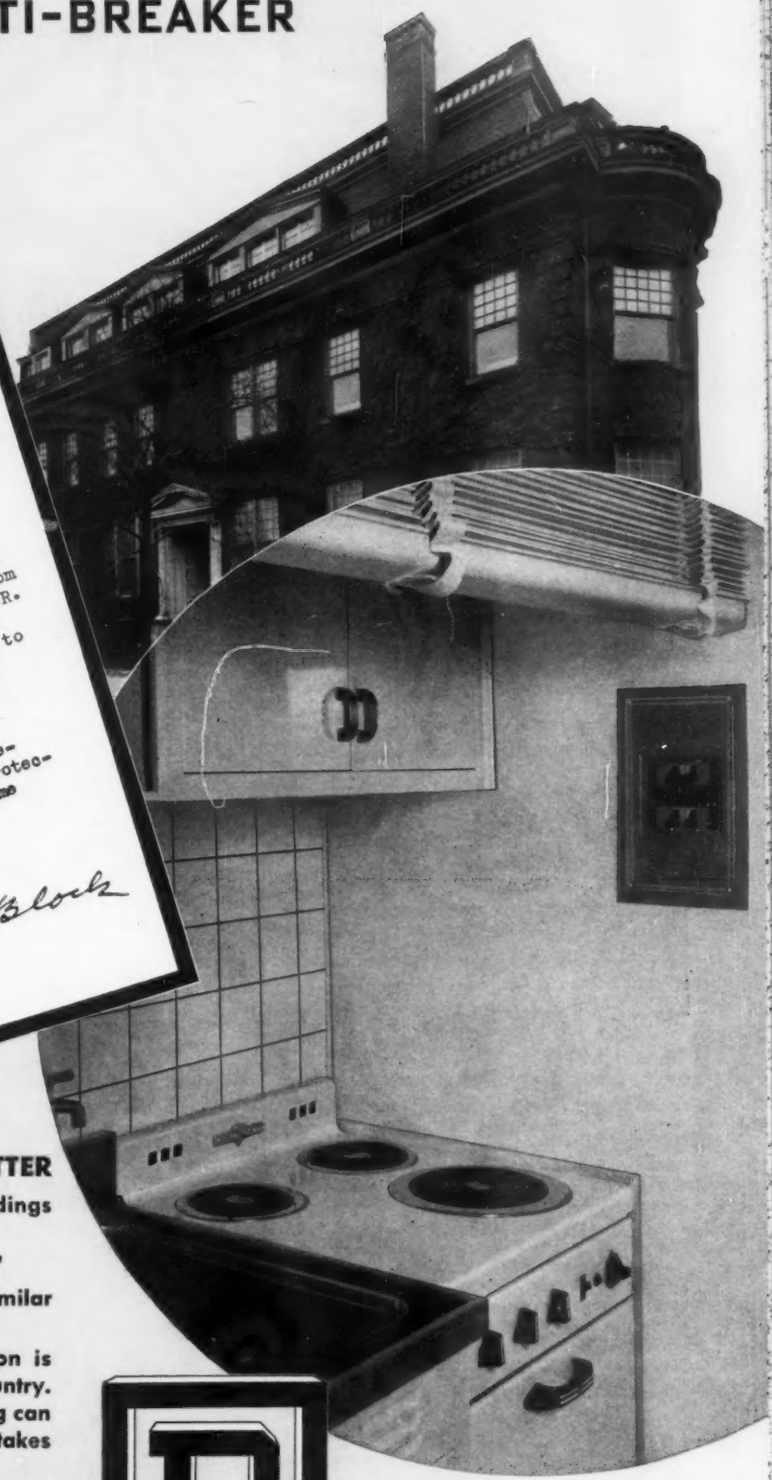
This job located just north of the loop in Chicago illustrates how old town mansions and apartment buildings can be modernized. Where there was skimpy wiring before, now you can find a wall outlet every few feet. The modern kitchenette included an electric range.

My search for a small flush type service box that would not spoil the neatness of the $125.00 a month two and three room studio apartments led finally to the Square D Multi-breakeR. I found the Square D Multi-breakeR was very compact and would give the added advantage of allowing the housewife to restore her own service when she accidentally caused a short without calling in outside help or running to the basement.

With the number of builders inspecting this unusual remodeling job, I believe that the automatic circuit protection provided by the Multi-breakeR is going to help me land several similar jobs very shortly.

Yours very truly,

Frank M. Block



STUDY THESE HIGH SPOTS OF MR. BLOCK'S LETTER

". . . illustrates how old town mansions and apartment buildings can be modernized."

"My search . . . led finally to the Square D Multi-breakeR."

". . . the Multi-breakeR is going to help me land several similar jobs shortly."

The current swing to home and apartment modernization is paving the way for progressive contractors throughout the country. The story of the Square D Multi-breakeR and adequate wiring can be told and *sold* wherever there is modernizing activity. It takes jobs out of the price class and away from competition.

If you're not thoroughly acquainted with the Square D Multi-breakeR, write for Bulletin CA-543A or call in a Square D man.

SQUARE D COMPANY

LOS ANGELES - MILWAUKEE - DETROIT

IN CANADA: SQUARE D COMPANY CANADA LIMITED, TORONTO, ONTARIO

When MULTI-BREAKERs are not specified—

"Figure Both Ways"

Fusible equipment and SQUARE D MULTI-BREAKERs

Your customers will prefer the MULTI-BREAKERs over fusible equipment, even at a slightly higher cost.

CAPTURE

Show Window Lighting Business with

Sterling LITE-FLO Reflectors

Merchants want the Extra Lighting Value Sterling Lite-Flo Reflectors afford. That's why so many contractors find them a big help in landing profitable jobs.

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Crapo GALVANIZED PRODUCTS

Where strains and stresses are heaviest, where corrosion takes its greatest toll, *Crapo* Galvanized Steel Strand and Telephone Wire constantly are proving their outstanding superiority. The heavy, tenaciously bonded zinc coating, maximum tensile strength and correct ductility insure longer life and lower maintenance cost. Insist upon *Crapo* Galvanized Products for better performance under all conditions! Ask your Jobber or write direct!

INDIANA STEEL & WIRE CO.
MUNCIE, ♦ INDIANA

Crapo Galvanized Strand and Telephone Wire can be obtained readily in all standard grades and sizes.

tures, Madison Park, to O. A. Carlson, Seattle.

By University of Washington to J. J. Agutter & Co., Seattle, for wiring on boiler plant additions.

By Bureau of Reclamation to Valley Iron Works, Yakima, Wash., for twelve 15½-in. diameter butterfly valves for installation in Boulder power plant, $18,631. To Bethlehem Steel Co., San Francisco, for structural steel for transmission towers for Southern California Edison Co. transformer circuit in Boulder switchyard, $17,660.

By U. S. Indian Irrigation Service to Nordbert Mfg. Co., Los Angeles, for one complete generating unit, consisting of engine, cooling water system, generator and exciter, switchboard, wiring, etc., for San Carlos Indian Irrigation Project, Collidge, Ariz., $165,043.

By Tacoma, Wash., Board of Contracts & Awards for equipment for City Light Dept. —three 1,000-kva. transformers to Love Electric Co., Tacoma, $8,050; voltage regulartor to Graybar Electric Equipment Co., Tacoma, $9,242; 40,000 lb. of assorted copper wire to Home Electric Co., Tacoma, $6,357; three 7.5-kv. circuit breakers to Kelmar Electric Co., Seattle, $1,233; one 15-kv. circuit breaker to Electric Motor Service Corp., Tacoma, $1,964.

●

R E A Activities

Quinault (Wash.) Light Co. has received an allotment of $19,000 to complete the 23-mi. project in Grays Harbor County.

Morgan County Rural Electric Assn., Fort Morgan, Colo., has received an allotment of $5,000 to finance wiring and plumbing installations for about 80 customers.

Clearwater Valley Light & Power Assn., Lewiston, Ida., has awarded a contract to Homer G. Johnson, Portland, for building the third section of the project consisting of 153 mi. of line, $136,782.

Flathead Light & Power Assn., Creston, Mont., has received an allotment of $8,700 to finance wiring and plumbing installations for about 74 customers.

Kootenai County (Ida.) Rural Electric Assn. has received an allotment of $214,000 to build 205 mi. of line to serve 663 customers in Kootenai and Benewah Counties, Ida., and Spokane County, Wash.

Blachly-Lane County Cooperative Electric Assn., Blachly, Ore., has awarded a contract to Bennett & Taylor Co., Portland, for constructing a generating plant building, dam and pipe line for the project, $36,577.

Flathead Power Co., Kalispell, Mont., has awarded a contract to Cahill & Mooney, Butte, Mont., for constructing 123 mi. of line in Flathead County, $98,872.

●

Answer to Professor Puzzelwit's Questions

A - 2	H - 3	O - 4	V - 2
B - 4	I - 4	P - 3	W - 1
C - 4	J - 3	Q - 2	X - 2
D - 2	K - 1	R - 2	Y - 2
E - 3	L - 3	S - 1	
F - 1	M - 4	T - 4	
G - 4	N - 1	U - 4	

ABOUT PEOPLE

K. M. Robinson Succeeds Post at Washington Water Power

Kinsey M. Robinson, former president of Idaho Power Co., was last month elected to succeed Frank T. Post as president of Washington Water Power Co. Post was elected chairman of the board, newly reduced from fifteen to nine members.

Robinson, 43, entered the electrical industry in 1911 when he went to work as a teamster for an inside wiring crew of the Idaho-Oregon Power & Light Co., predecessor of the Idaho Power Co. During the next five years he worked as foreman of an inside wiring crew, groundman on line construction, lineman and line foreman.

In 1916 he shifted to the commercial side when he was appointed local manager in his boyhood town of Parma, Ida. In 1921 he became division manager for the Payette division, and in 1927 was named manager of that division. He was called to the general offices at Boise in 1929.

K. M. ROBINSON

Two years later he was appointed assistant general manager; in 1933 he was elected vice-president and general manager, and in 1934 he became president and general manager. He added the chairmanship of the board to this office in 1937.

Post, who celebrated his 76th birthday in April, was first associated with Washington Water Power in 1909 as legal counsel. In 1919 he was appointed the company's legal adviser. Since that time he has served as member of the board, vice-president and, in 1930, president. He will remain active in company affairs in his new position.

Selected to succeed Robinson at Idaho Power was C. J. Strike, president of Northwestern Public Service Co. and three associated companies at Huron, S. D.

Strike started out in 1915 as a line-

Specify Locke for economy and security

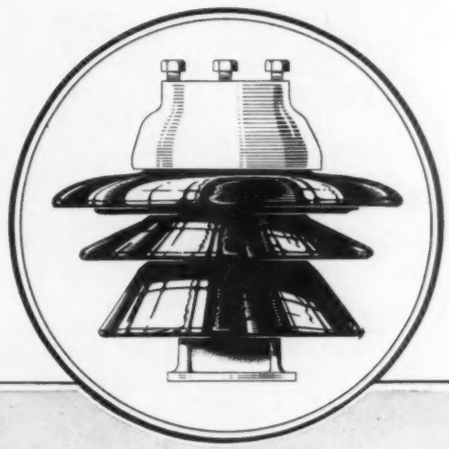
More than fifty per cent of all the switch and bus insulators in use in this country today were designed and manufactured by Locke.

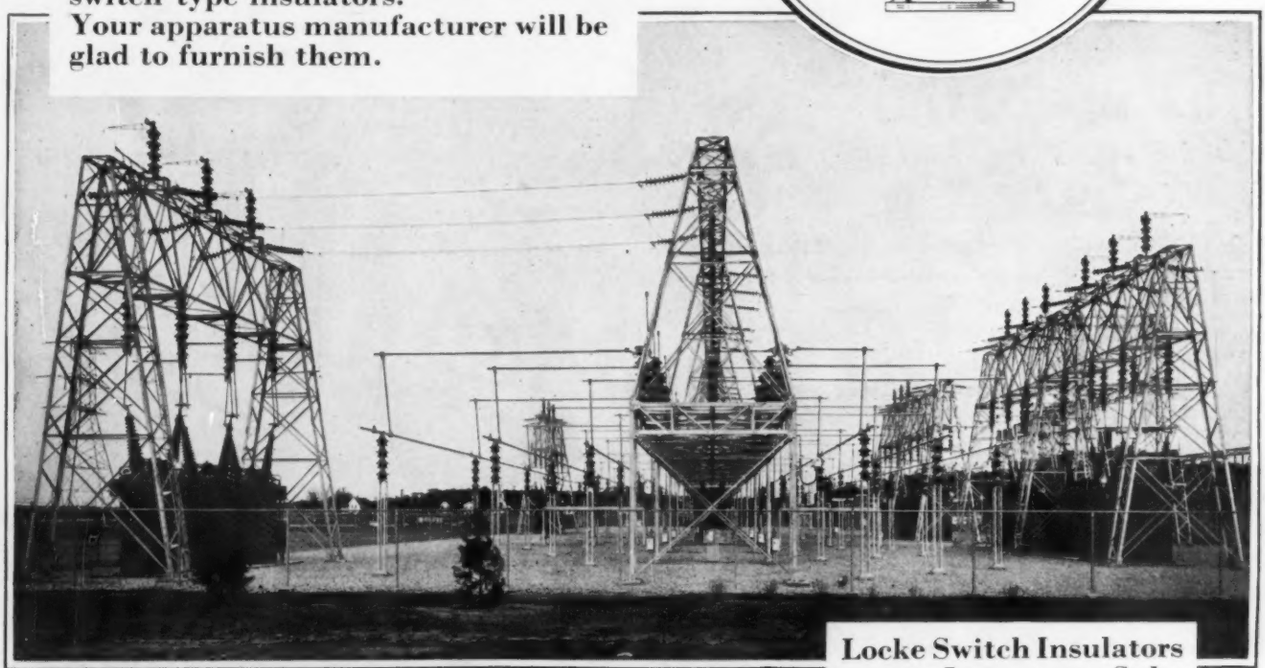
This constant preference which many engineers have expressed is the result of performance.

The excellent service records these scientifically designed, accurately made insulators have established are concrete evidence of the exceptional service they will render you. Their high electrical and mechanical characteristics, their extreme rigidity and ability to withstand abnormal shocks all mean longer life, lower final costs and reduced maintenance expense.

For economy and safety specify Locke switch type insulators.

Your apparatus manufacturer will be glad to furnish them.





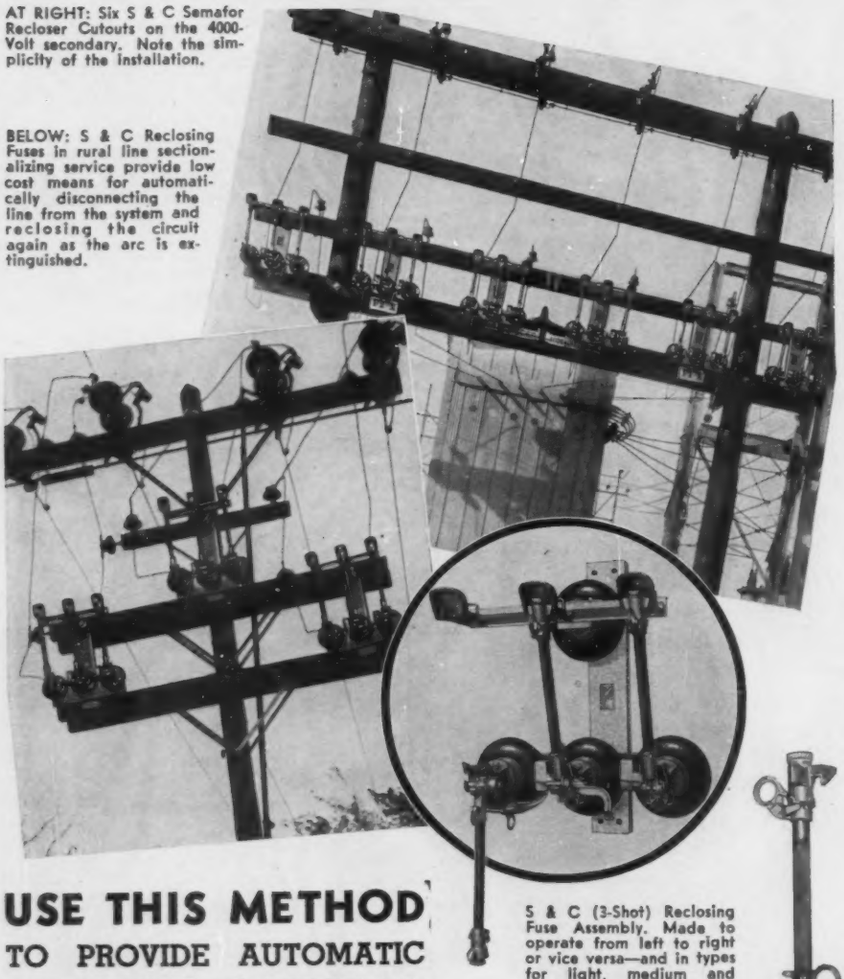
Locke Switch Insulators on an Important Substation in Michigan.

Locke COMPRESSION GLAZED PORCELAIN INSULATORS

LOCKE INSULATOR CORPORATION BALTIMORE, MARYLAND

AT RIGHT: Six S & C Semafor Recloser Cutouts on the 4000-Volt secondary. Note the simplicity of the installation.

BELOW: S & C Reclosing Fuses in rural line sectionalizing service provide low cost means for automatically disconnecting the line from the system and reclosing the circuit again as the arc is extinguished.



S & C (3-Shot) Reclosing Fuse Assembly. Made to operate from left to right or vice versa—and in types for light, medium and heavy duty.

S&C LINK is at lower or exhaust end of tube. The collapse of the spring causes a big gap instantaneously.

USE THIS METHOD
TO PROVIDE AUTOMATIC RECLOSING PROTECTION

Low Initial Investment—Low Annual Maintenance

Power companies have facts that show S & C Reclosing Fuses provide economical and reliable protection on distribution lines, feeder substations, and customer substations.

On branch lines the high reliability of S & C Reclosing Fuses is of importance where prolonged service interruptions would cause serious embarrassment to customers.

When any fuse blows, interruption of the circuit is instantaneous. Service is automatically restored through the next fuse—service trips and expense are eliminated—the customer loses little in outage time. The link is in the lower end of each holder—the fault is cleared faster—the arcing time is shorter—the holder is not subject to serious damage.

No other reclosing fuse can make similar claims—no other can offer the spring and cable assembly and the same accuracy and reliability.

SCHWEITZER & CONRAD, Inc.
4435 Ravenswood Ave., Chicago, Ill.
Manufactured in Canada by Powerlite Devices, Ltd., Toronto, Ont.
WESTERN REPRESENTATIVES
San Francisco: Geo. E. Honn, 420 Market Street
Los Angeles: Farnham & Cunningham, Edison Bldg.
Seattle: T. S. Wood, 220 Ninth Street, North
Salt Lake City: Riter Engineering Co., Kearns Bldg.

REG. U. S. PAT. OFF.

RECLOSING FUSES

man helping to construct Hitchcock, S. D.'s, first power lines. From there he progressed to ownership of an electrical contracting business to salesman for Peerless Electric Co., Minneapolis, to foundation, in partnership with a Webster, S. D., man, of the Midwest Electric Co. serving Webster.

In 1924 when Consumers' Electric Service Co., an expansion of the Midwest company, was incorporated in Northwestern Public Service Co., Strike was named sales manager of the new organization. Seven years later he was promoted to vice-president and general manager. Last year he was elected president. During these years the Northwestern company had grown until it and its affiliates now furnish electric service to 200 towns in the Dakotas and Nebraska and gas service to four towns. ●

Frost Ends 38 Years of Service with Edison Co.

W. L. Frost, Southern California Edison Co., vice-president, retired July 1 after 38 years of service with the company and the Western electrical industry. He left Los Angeles immediately for a European vacation trip.

Frost had been in charge of the company's commercial activities since 1922, when he became manager of what then was known as the customers' department. He was appointed vice-president in charge of sales in 1930, four years after he took over the general commercial managership. Under his direction the Edison commercial department developed into an organization of some 1,200 employees serving 32 geographical districts.

W. L. FROST

A varied experience in the company's business preceded Frost's appointment as commercial department executive. He joined the force as a groundman in Pasadena in 1900. His subsequent positions were bookkeeper, assistant purchasing agent, district manager, assistant

Lee Lethine of Anaconda Wire & Cable Co. grins gleefully as he holds up the A. E. Rowe trophy awarded him for low net score in the San Francisco Electrical Development League's annual golf tournament.

general agent, assistant to the president.

Frost was identified for many years with the PCEA and its predecessor organizations. He was president in 1927-28. He was also a member of the board of directors of the Pacific Coast Electrical Bureau and its immediate predecessor, the California Electrical Cooperative Campaign, from 1922 until the bureau was merged with the association in 1930. He was chairman of the bureau board of directors in that year.

●

John W. Wrenn Resigns from Pacific Gas and Electric

John Winchester Wrenn, dean of electric range sales managers and recently connected with dealer sales promotion work, resigned from Pacific Gas and Electric Co. July 1.

Born in Buffalo in 1868, Wrenn went to San Francisco in 1888 and went to work for the California Hotel, which had a light plant in its basement. When a company was formed to sell the hotel's surplus electricity he was made bookkeeper. And when, in 1902, the San Francisco Gas & Electric Co. took over the plant, he was put in charge of the utility's gas range department. Except for a time when he was manager of the wholesale and retail stores of the Hawaiian Sugar Co. in Honolulu, he thereafter remained in the utility field.

Returning from the islands in 1908, he sold gas heaters, then was made manager of Economic Gas Co. in Los Angeles. He remained in this position until the company was merged with Southern California Gas Co.; he was then made field production superintendent for a Kansas oil company.

At the invitation of James B. Black he became range sales manager for Great Western Power Co. in 1922. When Great Western merged with P.G.&E. he

SCHWARZE

Stanley & Patterson

Division of

PR

SCHWARZE ELECTRIC COMPANY

announce the appointment of

FARADAY

Allied Industries, Inc.

DEVEAU

as their exclusive sales representative in the Pacific Coast Territory

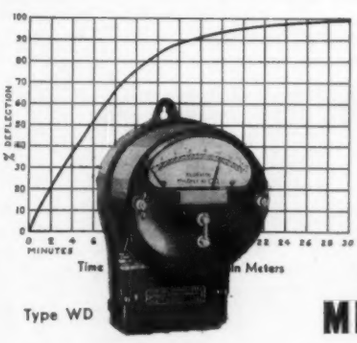
The Schwarze Electric Company recently announced the acquisition of the old well-known firm of signal manufacturers, Stanley & Patterson, Inc. of New York City.

Known since 1904 for the quality and completeness of its line of electrical signal devices—bells, buzzers and industrial horns—the name "SCHWARZE" now embraces an equally comprehensive line of complete signaling systems. This combining of two of the most familiar names in the signal manufacturing business not only makes available a single source of supply for nearly every conceivable residential and industrial signal requirement, but permits coordination of engineering and development activities of both companies for still further improvement in every phase of signaling equipment design and construction. If you are not now handling either the SCHWARZE or STANLEY & PATTERSON lines, we believe it to your advantage to investigate immediately the added profit possibility which this merger represents.

Communicate with Allied Industries in these cities: San Francisco, Los Angeles, Portland and Seattle.

Stanley & Patterson Division of SCHWARZE ELECTRIC CO.

LINCOLN DEMAND METERS



Time Response of Lincoln Meters

Type WD

Independent OF TIMING MECHANISMS

The above curve shows the time required to reach any percent of a steady load maintained for any given length of time. This time lag is inherent in the construction of Lincoln Meters and is due to the heat storage capacity of the material used.

SEND FOR YOUR COPY OF CATALOG TO:

LINCOLN METER COMPANY

SPRINGFIELD, ILLINOIS

was the first to see the potentialities of air conditioning, headed the first PCEA committee on air conditioning and organized the San Francisco Air Conditioning Society. For the past year he has been in dealer sales promotion work.

●

Cranston Quits G. E. but Retains Offices in S. F.

James A. Cranston, whose work for the past 49 years in electrifying the West has established him as one of the industry's pioneer salesmen, retired June 1 from active service as commercial vice-president of the General Electric Co., San Francisco.

Cranston first began selling electricity and electrical equipment in 1889 for the Northwest Thomson-Houston Co., St. Paul. Shortly after that company became a part of G.E. in 1892 he was named manager of the Northwest territory with headquarters in Portland.

In 1923 Cranston went from Portland to San Francisco to become Pacific Coast manager. In the same year he was elected a commercial vice-president of the company. Although he has now given up this position he will be available for consultation, and offices will be retained for him in G.E.'s San Francisco headquarters.

●

R. A. FOLSOM, W. R. Ames Co., has been elected president of the Air Conditioning Society of San Francisco succeeding Neil H. Peterson, Trane Co., president for the past two years. R. B. Plass, Harry Archer & Associates, is vice-president; Jerry Hill, Pacific Gas and Electric Co., secretary. Board of directors includes all the above and R. B. Holland, York Co.

●

JAMES H. MCGRAW, founder of McGraw-Hill Publishing Co., was guest of honor at a dinner given him by men who have received medals under the McGraw award.

A good salesman can take it, even when fishing. Here is O. R. Doerr of P. G. & E.'s commercial department going after black bass with determination that cold water fails to stop. A few minutes later he was up to his hips in Soda Springs reservoir. Incidentally the photographer had other pictures to prove that the party caught fish—3- to 5-lb. fighting bronzebacks

S. S. BLOOM and L. R. Knerr, both of the California State Railroad Commission, have been appointed chairman and secretary respectively of the general committees recently appointed to revise the commission's overhead line construction rules in order to simplify construction and thus permit lower cost distribution lines. Chairmen of subcommittees are: utilities, S. J. Lisberger; communications, D. I. Cone; electric railways, Julian Adams; farmers, J. J. Duel; industrial and manufacturers, M. A. deLew; Industrial Accident Commission, George Kimball. Vice-chairmen are to be appointed from southern California, committee members from the entire state.

●

R. G. DUMMEL, Holophane Co., has been elected chairman of the San Francisco Bay Cities Section, Illuminating Engineering Society, for 1939. Roy D. Myers, General Electric Supply Corp., is vice-chairman; John D. Erikson, Curtis Lighting representative, secretary. Board of managers includes Dr. Leland H. Brown, Stanford University; Leo G. Gianini, General Electric Co.; J. E. Hammond, San Joaquin Light & Power Corp.; Gilbert A. Trosper, P.G. & E., and F. J. Wellhouse, Westinghouse. Gianini, who spoke on the profit possibilities of the new fluorescent lamps at the June 10 meeting, was named to the IES Prize Award Committee.

●

GASKELL S. JACOBS, San Francisco accountant and engineer, has joined the Hawaiian Electric Co., Honolulu.

★ *For Quick Service on Quality Products from Local Stocks*

Get in Touch with: **GEO. E. HONN CO.**

420 MARKET ST. SAN FRANCISCO, CAL.

MANUFACTURER'S REPRESENTATIVE FOR:

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TRANSFORMERS
Gardner Electric Mfg. Co.
Power and Distribution Transformers
Lee Skipwith & Co., Inc.
Niagara Air-Insulated Current Transformers
CABLE GRIPS
Kellems Products, Inc.
CONNECTORS, GROUND ROD CLAMPS, UTILITY HOISTS
Jasper Blackburn Products Corp.
GROUND LINE POLE TREATMENT
Osmose Corp. of America
METERING INSTRUMENTS
Landis & Gyr., Inc.
CROMPTON TONG TEST AMMETER
Columbia Electric Mfg. Co.
UNDERGROUND TOOLS & EQUIPMENT
T. J. Cope, Incorporated
TREE TRIMMING EQUIPMENT
Bartlett Manufacturing Co.
FRICTION AND RUBBER TAPES
Clifton Manufacturing Co.

Now Stocked on the COAST

● NICHROME wire and ribbon in all sizes.

● Likewise NICHROME V, the longer-life alloy.

● Other D-H alloys for resistance purposes.

● Alloy castings and wrought pieces on special order.

● A truly representative stock of high nickel content alloys in various shapes and sizes, particularly NICHROME (Reg. U. S. Pat. off.) is now available to the Western trade.

● So bear this local warehouse in mind.

PACIFIC COAST WAREHOUSE:
316 11th Street
SAN FRANCISCO

DRIVER-HARRIS CO., HARRISON, N. J.

NICHROME

New Idaho Wiring Association Elects C. D. Purkhiser

C. D. Purkhiser of Caldwell, Ida., has been elected president of the newly organized Idaho Adequate Wiring Assn. W. A. Hopper of Boise is vice-president; J. C. Baldridge of Boise, secretary-treasurer. Additional vice-presidents were elected for each of the four districts into which the association's territory has been divided.

Started as a result of last winter's apprenticeship training course in wiring, the association will carry on an advertising program based on national adequate wiring promotion. Membership, which numbered 125 at the beginning, is divided into various classifications: contractors with shops, contractors without shops, journeymen wiremen, power utilities, manufacturers and wholesalers.

●

D. A. FARRELL, optometrist, has been named chairman of the newly organized Phoenix, Ariz., Eyesight Conservation Council. T. F. McDonough, illuminating engineer, is vice-chairman and J. L. Mudersbach, paint contractor, secretary. These with N. Pulliam, school superintendent, and H. Eckman, architect, comprise the board of directors.

●

H. D. LAIDLEY, general sales manager of the appliance division of Brunswick-Balke-Collender Co. and organizer of the Laidley Co., which distributed G.E. appliances in Portland, has been appointed vice-president in charge of sales for Standard Electric Mfg. Corp., Toledo, Ohio.

●

DR. PALMER H. CRAIG, consulting engineer for Roller-Smith, Bethlehem, Pa., was recently in California working with Electric Material Co., Inc., San Francisco and Los Angeles representative of the company.

●

J. B. KENNEDY, member of Northwestern Electric Co.'s Inspection department since 1925, has been appointed superintendent of the department to succeed the late A. L. Brown.

●

B. PINKERTON, formerly major appliance salesman at Paul Schatz Furniture Co., has joined the appliance sales force at Weisfield & Goldberg, Portland.

●

MEMBERS OF the electrical industry who were recently honored are Fred H. Vore, celebrating 25 years as Pasadena, Calif., city electrician, and Roy R. Robley, superintendent of operation for the Portland General Electric Co. observing his 63rd birthday.

E. O. SHREVE, former manager of General Electric's northern California division and now vice-president in charge of sales at Schenectady, has been named the first recipient of the Marston Medal, an award initiated this year by Iowa State College to honor outstanding achievement in engineering by its alumni.

●

DIRECTING THE recent three-day Electrical Exposition conducted by the Yuba Sutter unit of the Electric Appliance Society of Northern California for the benefit of 3,000 visitors were: Margaret Finner, home economist of the Sacramento division, P.G. & E., who conducted cooking classes; Herbert Shafer and William Goss, in charge of finances; Walter Meuron, P. G. & E. lighting supervisor, in charge of wiring and lighting; Cliff Speers, who handled special invitations to the cake-baking contest; Harry Thomas, P. G. & E., in charge of admissions; H. P. Humphreys, division sales manager, P. G. & E., in charge of the cake-baking contest, and Melvyn Holton, dealer sales promotion representative of the Colgate division, P. G. & E., secretary.

●

A. J. SNOW, chief electrical engineer of the Board of Fire Underwriters of the Pacific, San Francisco, has resigned to join the Oregon Insurance Rating Bureau, Portland. He is succeeded by M. K. Bliss, connected with the Board of Fire Underwriters for several years.

●

T. A. PANTER, Los Angeles Power & Light Board engineer, has been appointed engineer for the joint congressional committee investigating the TVA.

●

WALLACE H. WHITE of the Simons-White Appliance Co., Jerome, Ida., has been awarded a diamond ring for exceeding quota in Kelvinator sales last year.

●

Deaths

M. J. WILKINSON, 59 treasurer and assistant secretary of Pacific Power & Light Co., died last month at his home in Portland. Born in New York, Mr. Wilkinson joined the utility in 1911 as chief accountant. Later he served as traveling auditor and assistant to the treasurer. He took over the positions he held at his death in 1918.

●

CHARLES P. STANTON, chief electrician of the California Harbor Commission at San Francisco, died last month after a short illness. Mr. Stanton had supervised all electrical construction and upkeep in connection with the harbor since his appointment in 1911.

THERE ARE "BESTS" IN EVERY INDUSTRY

IN ELECTRICAL APPLIANCES IT'S Sunbeam

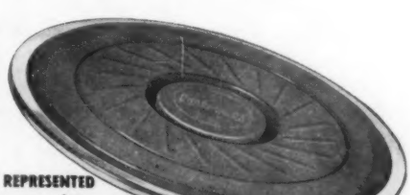
★ Automatic MIXMASTER ★ Double-Automatic IRONMASTER ★ Silent AUTOMATIC TOASTER ★ COFFEEMASTER ★ WETPROOF HEATING PAD ★ MASTER CORD and PLUG SET ★ GLASS COFFEE MAKERS FANHEATER ★ FLAT TOASTER ★ Automatic CLOTHES SPRAYER.

Made and guaranteed by

CHICAGO FLEXIBLE SHAFT COMPANY
5600 West Roosevelt Road, Chicago, Ill.
316 Commercial St., Los Angeles, Cal.
921 11th Ave. N., Seattle, Wash.
224 S. W. Temple St., Salt Lake City, Utah
47 YEARS MAKING QUALITY PRODUCTS

CHROMALOX
Super-Speed RANGE UNITS

EVERYWHERE they are popularizing electric cooking—demonstrating new cooking speed, new cooking economy, new cleanliness and convenience, new long service life. For dealers and utilities they are providing new freedom from servicing worries. Now furnished on many ranges. Fit all makes—ideal for replacement.



REPRESENTED by

MONTGOMERY BROTHERS
911 Western Ave., Seattle, Wash.
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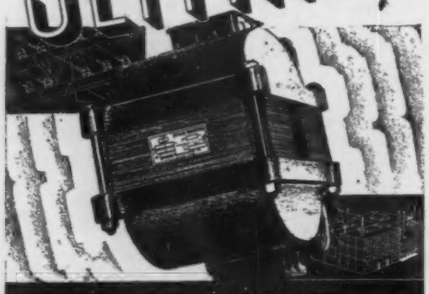


TRANSFORMERS

Save Their Cost and Pay Dividends by—

1. Elimination of duplicate conduit runs.
2. Saving in power rate.

(Put all of your 110-volt equipment on a 220-volt or 440-volt power circuit, it is economical.)

JEFFRIES TRANSFORMER COMPANY
5706 Long Bech Ave. Los Angeles

Going away?

Leave Worries Behind!

Our booklet, *An Introduction to Agency Service*, tells how we would collect the income, execute orders through your own broker for purchases and sales, collect principal upon maturity, etc.,...relieving you of all bothersome routine connected with your investments.

You may have a copy, on request. Ask for booklet M-3

CROCKER FIRST NATIONAL BANK
OF SAN FRANCISCO
California's Oldest National Bank

Speakers

At a kitchen modernization and scientific kitchen planning meeting sponsored by the Fresno Electrical Appliance Society—F. H. Harrington, Pacific Coast manager, Kitchen Modernization Bureau: The kitchen modernization idea may be one of the prime factors in leading the country out of recession. Stanford Berry, Household Products Co., Oakland: Sound selling methods, backed by informative facts, are necessary to assure success of the kitchen program.

Before the Denver; Pueblo, Colo.; Casper and Rawlins, Wyo., Electrical Leagues—W. C. Stephenson, Modern Kitchen Bureau, New York.

Before the Electric Club of San Diego—Alston Rodgers, illuminating engineer, General Electric Co., presenting his skit, "So Light and the Seven Dwarfs."

At the tenth annual Institute of Government conducted by the University of Southern California School of Government—Herbert G. Ufer, Western superintendent, Underwriters' Laboratories, Los Angeles; R. H. Manahan, chief of the electrical division, City of Los Angeles; Fred H. Vore, city electrician, Pasadena.

A. E. Schanuel, field representative, National Adequate Wiring Bureau: Adequate wiring bureau's promotional material—before electric clubs, local wiring bureaus, contractors' groups, etc., in the major cities of the eleven Western states.

At a luncheon, held in Vancouver by Canadian General Electric Co. and B. C. Electric Railway Co., at which prizes in the "electrical way of living" essay contest were awarded—Douglas Robertson, district manager, Canadian G. E.; W. C. Mainwaring, E. E. Walker, J. Lightbody, all of the Railway company.

V. E. Vining, manager of department store sales for Westinghouse, will be one of two or possibly three speakers at the radio appliance trade dinner, July 27, at the Fall Market (July 25-29) of the Western Furniture Exchange, San Francisco. His subject will be "Dirt Selling." Invitations have also been extended to J. J. Whitehead of Whitehead Metal Products Co., New York, and J. W. Mason, president of Nash-Kelvinator Corp. and initiator of the "salesmen's crusade."

●

AUBREY POWELL, floor salesman in Montana Power Co.'s Great Falls office, is now city salesman for Palmquist Electric Co., new Hotpoint dealer in Great Falls.

●

HARRY MOELLER has been appointed sales manager of Clauson Refrigerator Co., Missoula, Mont.

TRADE NOTES

KELVINATOR SETUP in Montana has undergone recent drastic changes. Taylor Refrigeration & Appliance Co., wholesale division, Billings, has been appointed Montana distributor for Kelvinator household appliances. Modern Utilities Co., Helena, which formerly handled the line, as well as the commercial line, will continue as distributor only of the commercial products. The Taylor company's retail division will handle retail sales for both commercial and residential lines in Billings. In charge of the Taylor operations are L. I. Taylor, wholesale, and Lloyd Anderson, retail.

●

GEORGE GRAY, manufacturers' representative for Wiremold Co. and Edwards Co., is moving from 1250 Folsom St., San Francisco, to a larger building at 2720 17th St. on Aug. 1. The new building will be wired throughout with wiremold and plugmold and will make use of the multibreaker circuit control.

●

FORST'S LTD., Vancouver, B. C., appliance store, has opened a model home at West Vancouver.

●

ELECTRIC SPECIALTY CO., San Francisco, has been named Pacific Coast representative for Driver-Harris Co., manufacturer of high nickel-content alloys. Stocks will also be maintained in Los Angeles and Seattle.

●

KELVINATOR FACTORY BRANCH for household appliances only has been opened at 1027 N. Holland Ave., Los Angeles. A. T. McIntyre is manager.

●

GENERAL ELECTRIC CO. last month purchased 145,000 sq. ft. of land at the corner of Eighth and Harrison Sts., San Francisco, on which to erect a $1,000,000 building to house all its offices and activities. Purchase price was $195,000.

●

DAVIDS' DEPARTMENT STORE, MOSCOW, Ida., opened its new G.E. kitchen to the public with a two-day cooking school that attracted 1,000 women.

●

BAUGH PLUMBING CO., Preston, Utah, has taken the agency for L & H ranges and water heaters and Fairbanks-Morse refrigerators and washers.

●

SUPERIOR SWITCHBOARD & DEVICES CO., Canton, Ohio, closed its factory and offices July 1 to July 10 because, according to the announcement, "all work and no play makes Jack a dull boy."

HOLLYWOOD WHOLESALE ELECTRIC CO. has opened a new branch at 1761 W. Jefferson St., Los Angeles. Manager is Ed Faeh; Harold Watkins and Les Wilson are salesmen.

●

ALLIED INDUSTRIES, INC., manufacturers' representative in San Francisco, Los Angeles, Portland and Seattle, has been appointed agent for Schwarze Electric Co., Adrian, Mich., which recently absorbed Stanley & Patterson Co.

●

GRUNBAUM BROS. has been appointed Seattle dealer for Norge refrigerators and home appliances.

●

BROGAN HARDWARE CO. is a new appliance store opened in Oakesdale, Wash., by W. M. Brogan.

●

WILLIAM F. O'KEEFE JR., San Francisco, has been named northern California distributor for West Wind ventilating fans.

●

HELWIG CO., Milwaukee manufacturer of carbon products, has opened a branch office at 553 Howard St., San Francisco. E. A. Shamlin is in charge.

●

LEWISTON (MONT.) ELECTRIC CO. is now handling the Bendix home laundry.

●

Moved

FORST'S, LTD., New Westminster branch of the large British Columbia appliance and home furnishing business, from 701 Columbia St. to 401 Columbia St.

ALEMITE CO., Portland appliance shop, to 424 NW. 14th Ave.

SUNRAE HEATING CO., Salt Lake City dealer in furnaces, stokers, blowers and water heaters, to 253 W. South Temple.

INDUSTRIAL ELECTRIC CO., new Northwest distributor for Nash Kelvinator commercial refrigeration, etc., from 1304 Stewart St., Seattle, to larger quarters at 1276 Denny Way.

HOPPER ELECTRICAL SERVICE from 1343½ Constance St., Los Angeles, to 2370 Silver Ridge.

A. J. COLE, representative for McGraw Electric Co., from 1627 Hipoint Ave., Los Angeles, to 834 Venice Blvd.

COLUMBIA STEEL CO., Los Angeles, to new office building at 2087 E. Slauson Ave. Building has a combined heating and air conditioning system operated on a zone control basis, thus allowing different portions of the building to maintain atmospheric conditions within the comfort zone.

ELECTRICAL TESTING LABORATORIES

Electrical Photometrical, Chemical and Mechanical Tests. Inspection of Materials and Apparatus at Manufactory.

80th St. and East End Ave., New York

PRODUCT DATA

Free to you . . . Any of these instructive bulletins simply by addressing a post card to ELECTRICAL WEST and asking for the desired bulletin by number.

701:
IMPULSE TURBINES; 32-page booklet covering all phases of the subject and including pictures of actual installations and diagrams. S Morgan Smith Co.

702:
MICROMAX FREQUENCY RECORDERS and indicators; discussion of considerations responsible for the increasing use of equipment for frequency measurement and frequency-load control; description of instruments. Leeds & Northrup.

703:
NETWORK TRANSFORMERS and other network equipment; application construction and design described. Westinghouse.

704:
VARNISHED, CAMBRIC, INSULATED CABLE; types available, construction, characteristics and applications described. Also simplified data on how to select conductor size. General Electric.

705:
ELECTRIC ROASTERS and casseroles; new eight-model line illustrated and described. National Enameling & Stamping Co.

706:
POWER INSULATORS and line hardware; latest illustrated catalog. Corning Glass Works.

★ SELL **Ironrite** IRONERS TO BUILD PROFIT ..Attract CUSTOMERS

IRONRITE MODEL 55
READY FOR USE
Price $134.95
Other models from
$79.95 to $144.95

THERE are money-making opportunities in the exclusive Ironrite dealer franchise. Hundreds of dealers are enjoying greater sales and greater profits through this franchise.

Dealer discounts are most liberal. And the Ironrite Ironer has "sales appeal" unapproached by any other ironer. It is scientifically designed to iron quicker and with less effort. Your customers will immediately appreciate its many exclusive features—outstanding being the **double, open, unobstructed, usable ends** and **heat application is scientifically correct."**

Start making profits at once. Write us for details on franchise available in selected territories. Also for details on our training of demonstrators in our regularly conducted ironer school to help you build an efficient sales force. Use the coupon below.

Gordon E. Wilkins Ironers
Incorporated
"IRONER SPECIALISTS"

3100 Telegraph Ave.
Oakland, Calif.

2155 E. 7th St.
Los Angeles, Calif.

Warehouse Stocks at Oakland, Los Angeles, Denver and other western distributing centers

Gordon E. Wilkins Ironers, Inc.
3100 Telegraph Ave., Oakland, Calif.

Yes, I am interested in the details on the profitable Ironrite exclusive dealer franchise.

Name .....

Address .....

City .....

707:
CONSTANT CURRENT REGULATORS, pole and subway type; construction and features of each type described. Tables give characteristics of various styles. Westinghouse.

708:
ELECTRIC MOTORS; improvements made in closed types described in leaflet. Sterling Electric Motors, Inc.

709:
WIDE-LIMIT, single-phase watt-hour meter fully described and illustrated. General Electric, GEA-2721A.

710:
RECESSED LIGHTING EQUIPMENT cataloged and illustrated; installation suggestions made. Curtis Lighting, Inc.

711:
SUBWAY OIL DISCONNECTS described, illustrated and diagrammed in 8-page bulletin. G & W Electric Specialty Co.

712:
BRACKET BEARING VOLTAGE REGULATORS; bulletin describing recent changes and developments, operation and general design features. Allis-Chalmers.

713:
BRANCH FEEDER VOLTAGE REGULATORS; bulletin describing recent changes and developments, operation and general design features. Allis-Chalmers.

714:
ELECTRIC MOTORS FOR THE FARM; their uses analyzed in a summarized data guide chart setting forth the type, rating and power consumption of the motor recommended for performing each of about 70 farm jobs. General Electric, GED-664.

715:
PORTABLE ELECTRIC TOOLS; complete 1938 line cataloged. Independent Pneumatic Tool Co.

716:
NEW LINE FOR OLD EQUIPMENT; pamphlet telling how achieved with International Nickel Co.'s money gaskets, pump parts, valve trim.

717:
CONDUIT FITTINGS; complete line described in third edition of catalog. Simplet Electric Co.

718:
LIVE LINE MAINTENANCE; booklet describing equipment and its applications. Also information on display truck which tours country making free demonstrations. A. B. Chance Co.

719:
OUTDOOR POWER SWITCHING EQUIPMENT fully cataloged and described in 175-page book. General Electric. No. GEA-627.

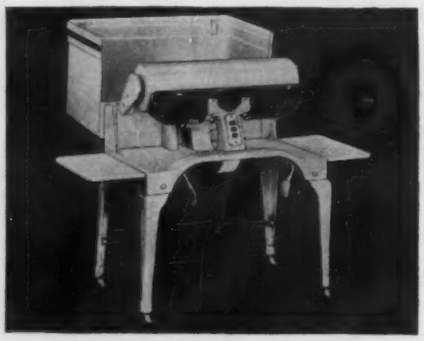
720:
RECTOX RECTIFIERS; pamphlet telling how rectifiers open up possibilities for design of new products and improvement of old. Westinghouse.

721:
WIRING DEVICES, complete line cataloged. B. Hartman.

NEW PRODUCTS

Washers & Ironers

Following companies have introduced new lines of washers: Dexter Co., with two twin, six single models; Easy Washing Machine Co., featuring on seven of its 31 models a rubber-covered agitator; General Electric, with five wringer-type, two spin-basket models. New ironers have been introduced by: Easy, who announces a three-speed control; Landers, Frary & Clark, with a cabinet and popular price model; General Electric, with an automatic flatplate model and three rotary models; Edison General Electric Appliance



Co., offering a console model and two smaller models. Ironrite Ironer Co.'s model 55 (illustrated) boasts feather touch knee control and knee pressing control. As a result of these automatic controls both hands are free at all times to arrange and guide garments. When cabinet cover is swung back, cabinet support automatically lowers to the floor, thus bracing ironer.

●

Outdoor Current Transformers

Reduction in size of outdoor current transformers by 50 per cent in ratings from 23 to 161 kv. has been announced by General Electric. Despite size reduction, the company announces tests showing that variation in ratio correction factor is small even when primary current is but 5 per cent of rated.

●

Double-Capacitor Motors

Wagner Electric Corp. has announced the addition of high-torque, double-capacitor motors to its line. They are available at 110-220 volt, single plase, ⅓, ½, ¾ and 1 hp.

●

Individual Lighting Transformer

A transformer designed for individual lighting of electrically operated machines is offered by American Transformer Co. It is designed for mounting on a machine with its input connected to the power circuit at the motor disconnecting switch. Units are available for inputs of 115, 230, 460 or 575 volts and outputs of 6, 32, 64 or 115 volts.

Stop Joints

To prevent oil and compound migration between lengths of cable, G & W Electric Specialty Co. has introduced new stop joints. These consist of two flanged bells, a flanged midsection with porcelain insulators and copper connectors within the porcelain tubes. They are designed to withstand 70 lb. per sq. in. oil pressure.

●

Ranges

Standard Electric Mfg. Corp. has added two new ranges, the Capitan (regular domestic size but with an 18-in. oven) and the Colonel, equipped with four surface burners, one-piece porcelain enamel lined oven with recessed burners and self-contained runners, warmer and two utility cabinets.

●

Frozen Malted Milk

Frozen malted milk machine which freezes the mix by electrical refrigeration and whips by electrical motor has been announced by the Frozen Malted Milk Machine Co. A counter model, the unit comes all equipped with coil and valve ready to be attached to compressor.

●

Test Oscillator

Individual calibrations with hand-drawn scale divisions are features of Weston's new test oscillator. Purpose of this calibration is to avoid use of trimmer condensers. It is intended for high stability operation from any 110- to 120-volt, 60-cycle, a.c. line, with output characteristics independent of line voltage fluctuation.

●

Interval Timer

An interval timer driven by synchronous motor, rated 10 amp. 120 volt a.c., or 5 amp. 220 volt a.c., available with timing scale ranging from a 1-min. dial with divisions in seconds to an 8-hr. dial with 15 min. divisions, is being offered by R. W. Cramer & Co., Inc. It is available with normally open, normally closed or double-throw silver contact, totally enclosed.

●

Filler Compound

General Electric Co. has announced an oil-resistant filler compound, fluid at pouring temperatures, and non fluid at operating temperatures. It is recommended for compound-filled splices and terminals rated 15 kv. and above, and is called No. 1332. Dielectric constant and power factor are higher, but improved voltage distribution and insolubility compensate for this in many applications.

●

Reflector

A reflector which may be screwed into existing light sockets, particularly for improving window lighting, has been announced by Wakefield Brass Co. It is designed for 150-watt lamps and is made of aluminum with the inside finished in part satin and part polished to produce a concentrated beam.

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General Elec. Co.
Graybar Elec. Co., Inc.
Kelvinator Corp.
Norge Division, Borg-Warner Corp.

Ammeters and Voltmeters
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General Elec. Co.
Roller-Smith Co.
Westinghouse Elec. & Mfg. Co.
Weston Elec. Instr. Corp.

Anchor and Guy Rods
A. B. Chance Co.
General Elec. Co.
Hubbard & Co.
Maydwell & Hartzell, Inc.

Anchors, Guy
A. B. Chance Co.
Everstick Anchor Co.
Hubbard & Co.
James R. Kearney Corp.
W. N. Matthews Corp.

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General Elec. Co.
General Elec. Supply Corp.
Graybar Elec. Co., Inc.
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Buses
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General Elec. Supply Corp.
Graybar Elec. Co., Inc.
Killark Elec. Mfg. Co.
McGill Mfg. Co.
Westinghouse Elec. Supply Co.

● INDEX TO ADVERTISERS

JULY, 1938

Allis-Chalmers Mfg. Co. 9

Brewer-Titchener Corp., The 11

California Oregon Power Co. 26, 27
Chicago Flexible Shaft Co. 55
Crocker First National Bank 56

Driver-Harris Co. 54

Electrical Testing Labs. 57

G. C. A. Mfg. Co. 59
General Electric Co. 2, 5, 12
Graybar Electric Co., Inc. 6

Honn Co., Geo. E. 54

Idaho Power Co. 26, 27
Indiana Steel & Wire Co. 50

Jeffries Transformer Co. 56

Kearney Corp., James R. 3
Klein & Sons, Mathias 48

Lincoln Meter Co. 53
Locke Insulator Corp. 51

Montana Power Company, The 26, 27

Okonite Company, The 8
Okonite-Callender Cable Co., Inc., The 8

Pacific Coast Electrical Bureau ..... Back Cover
Pacific Gas and Electric Co. ..... Inside Back Cover
Pacific Power & Light Co. 26, 27
Portland General Electric Co. 26, 27
Puget Sound Power & Light Co. 26, 27

Rocky Mountain Electrical League 26, 27

Schwarze Electric Co. 53
Schweitzer & Conrad, Inc. 52
Shell Oil Company 45
Southern California Edison Co. Ltd. ..... Inside Front Cover
Square D Company 49
Standard Elec'l Porcelain Mfgrs. 10
Stanley & Patterson Div. of Schwarze Elec. Co. 53
Sterling Reflector Co. 50
Superior Switchboard & Devices Co., The 47

Tork Clock Co., Inc., The 60
Triangle Conduit & Cable Co., Inc. 4

Utah Power & Light Co. 26, 27

Washington Water Power Co. 26, 27
Wiegand Co., Edwin L. 55
Wilkins Co. Ironers, Inc., Gordon E. 57

Youngstown Sheet & Tube Co. 7

Preview of coming campaigns by

P·G·and E·

COMMANDS MORE SERVANTS THAN ALADDIN'S LAMP

ELECTRIC APPLIANCE SOCIETY OF NORTHERN CALIFORNIA

JULY

ELECTRIC RANGE AND WATER HEATER CAMPAIGN

ELECTRIC advertising during July will feature a combination range and water heater deal whereby the customer receives up to $50.00 to cover installation and wiring. Newspaper advertisements will be published weekly. Supporting media will include outdoor posterboards, truck signs, etc.

RETAILERS:

See our local office as to where and how you also can make this deal, then see your local newspaper and arrange for a series of tie-in advertisements to be published along side of ours. Do it today!

DEALERS: By watching this page from month to month you can keep informed of sales promotional campaigns to be sponsored by the Pacific Gas and Electric Company and the Electric Appliance Society. Detailed information will be supplied, as usual, through the mail. If such information is not received, call our local office or write Electric Appliance Society, 1355 Market St., San Francisco, Calif.

It's a fact!

There are more wired homes without Electric Refrigerators today than in 1922

● Many of us are inclined to sigh for the "good old days" of the early 20's when America was a virgin market for the electric refrigerator. Actually there are more wired homes today without electric refrigerators than there were in 1922.

In 1922 there were ten million wired homes without electric refrigeration. Today there are eleven and a half million. New construction and wiring of existing residences, which has been far ahead of refrigerator sales, accounts for this situation.

Fifteen years ago electric refrigeration was new and untried; expensive to buy and operate. Today even the U. S. Government classes the electric refrigerator as a necessity; prices are within reach of all; operating costs are negligible.

So, don't be misled by gloomy predictions. The advance of electric refrigeration cannot be stopped any more than the automotive industry could be stopped. Just as sure as there is today a car in every garage, so will there eventually be a refrigerator in every kitchen.

Pacific Coast Electrical Bureau

601 W. 5TH STREET, LOS ANGELES ● 447 SUTTER STREET, SAN FRANCISCO